

The Native Calendar of Central America and Mexico.

A Study in Linguistics and Symbolism.

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§ 1. PURPOSE AND METHOD OF THIS INQUIRY.

Of all the intellectual monuments which remain to us of the native race of the Western Continent, the most remarkable without doubt is the Calendar system which was in use among the more civilized tribes of Mexico and Central America. Years ago, Alexander von Humboldt assigned to it the first rank among the proofs that they had reached a certain degree of true civilization; indeed, so deeply did its intricacies impress him, that he could not believe that it was wholly developed by tribes so uncultured in some other respects, and sought for its chief principles an origin among the old civilizations of Asia.*

A profounder study of the subject, rendered possible by more abundant documents, especially of a linguistic character, has shown that the hypothesis of the great naturalist is unnecessary,

* See his *Vues des Cordillères et Monumens des Peuples Indigènes de l'Amérique*, Tome 1, p. 832, etc.

and indeed contrary to the evidence. The peculiarities which mark this Calendar belong to itself alone, and differ completely from those on which the time-counts and astronomical measurements of the ancient nations of the Old World were based. It is strangely and absolutely independent and American in its origin and development.

The especial object which I have in view in this essay is to collect the month and day-names of all the nations of the Maya stock within my reach, and subject them to an etymological analysis and comparison with their correspondents in the Zapotec and Nahuatl tongues, and to endeavor to reach the symbolic significance of the Calendar as a mythical record and method of divination.

I confine myself to the linguistic analysis, and avoid that based on the hieroglyphic writing, of which so much use has been made by Prof. Cyrus Thomas, Dr. Schellhas, Dr. Seler and others, because I believe it must be brought into requisition with great caution and under strict limitations. The leading principle of this writing is, in my opinion, essentially phonetic, and not representative; but phonetic according to what I have called the "ikonomatic" method, which means that the glyph or figure is a picture, not of the object, but of the name of the object, as in what is called a "rebus."*

The consequence of this is, that it becomes quite misleading to seek the real meaning or derivation of a day-name or other word from the figure which represents it in the hieroglyphic writing. The latter stands usually for a word of an entirely different meaning, the only connection being a more or less similarity in sound.

This will readily be understood by a few examples of this method of writing in our own tongue. In it, for instance, the pronoun "I" would be represented by the picture of an eye; a (writing) pen by the picture of a (hog) pen; "matron" by a mat, and a person running; and so on.

It is evident that any attempt to derive from such figures the literal names of the day or month would lead the inquirer wholly astray. Yet in spite of the fact that we have any number of examples proving that this method was constantly in use by the

* See my *Essays of an Americanist*, pp. 213-229 (Philadelphia, 1890), for a full explanation of the ikonomatic method.

Nahuas and Mayas, the authors above referred to and others have repeatedly overlooked it, and have often been led into obviously erroneous interpretations.

§ 2. GEOGRAPHIC EXTENSION OF THE CALENDAR SYSTEM.

We know to a certainty that essentially the same Calendar system was in use among the Nahuas of the Valley of Mexico and other tribes of the same linguistic family resident in Tlascalcan and Meztitlan, in Soconusco, Guatemala and Nicaragua; that it prevailed among the Mixtecs and Zapotecs; and that of the numerous Mayan tribes, it was familiar to the Mayas proper of Yucatan, the Tzentals and Zetzils of Chiapas, the Quichés and Cakchiquels of Guatemala, and to their ancestors, the builders of the ruined cities of Copan and Palenque.

There is no direct evidence that it had extended to the Huastecas, of Maya lineage, on the Rio Panuco; but it was in vogue among the Totonacos, their neighbors to the south, on the Gulf of Mexico. The Pirindas, Matlazincas and Tarascos of Michoacan had also accepted it, though perhaps not in a complete form.* The Chapanees (Chiapanees) or Mangues, part of whom lived in Nicaragua and part in Chiapas, had also adopted it.

The tribes above named belong to seven entirely different linguistic stocks, but were not geographically distant. Outside of the area which they occupied, no traces of this Calendar system, with its many and salient peculiarities, have been found, either in the New or the Old World.

The date of this wide dispersion we cannot assign, but we can positively say that it was many centuries before the conquest of the country by the Spaniards. We know that in the Mayan territory the builders of the ancient cities of Palenque in Tabasco, and Copan in Honduras, both of which had been deserted and ruined long before the arrival of Cortes, were familiar with a well-developed form of this Calendar, and with the graphic methods for carrying out its computations. We further know that the migrations of the Nahuas from Central Mexico, to form the colonies of the Pipiles in Guatemala, and of the Nicaraos in Nicaragua, took place after that stock had elaborated their special

* On this point, consult the *Anales del Museo Michoacano*, Tomo 1 (1888), p. 85, for a critical exposition of the question, by the Rev. Paso y Troncoso. Also, Orozco y Berra, *Historia Antigua de Mexico*, Tomo II, p. 144 et seq.

form of the Calendar, because these emigrants carried it with them, and preserved it until the advent of the Europeans. Such facts incline us to accept the statement of the Quiché astronomers to the effect that they had been regularly keeping their national annals by this time measurement for at least eight hundred years before the advent of the Spaniards in 1524.*

The Mayan dialects of which I can avail myself are the Maya proper of Yucatan; the Tzentäl of Chiapas; and the Quiché and Cakchiquel of Guatemala. The last two differ very slightly from each other, and may be considered as one language. The Tzentäls and Zotzils were closely allied branches of the stock, who inhabited a considerable portion of Chiapas and Tabasco when this region was first explored by the Spaniards. Early writers often call the Tzentäls, "Tzendals" and "Zeldals," through a corruption of their proper name, which is Tzentäl, there being no *d* in their alphabet. The Zotzils called themselves Keren, "young men," which the Spaniards changed into Quelenes.

Garcia de Palacio, writing in 1576, includes both under the compound name, Zeldal-Quelen, as one language.† They have from time to time been spoken of erroneously as Chiapanecs. These, whose right name is Chapanecs, are linguistically in no way related to the Mayan stock.

The Tzentäl dialect is not distant from the pure Maya. In his scheme of the divarication of the stock, Dr. Stoll places it, indeed, as the branch nearest allied to the tongue spoken in Yucatan.‡ I am inclined, however, from my own studies of these dialects, to accept as correct the uniform traditions of the Cakchiquels, Quichés and Tzutuhils of Guatemala, who traced their ancestry to the same parentage as that of the Tzentäls and Zotzils; thus bringing the dialects of Chiapas into closer relationship to those of Guatemala than to those of the Peninsula of Yucatan.§

* "Demas de ochocientos años," Herrera, *Historia de las Indias Occidentales*, Dec. lii, Lib. iv, cap. 18.

† *Carta al Rey*, p. 20 (Ed. Squier).

‡ Dr. Otto Stoll, *Ethnographie der Republik Guatemala*, s. 84 (Zurich, 1884). The form "Tzotzil" adopted by this writer is not so correct as "Zotzil."

§ I do not include the Chol among the proper dialects of the Tzentäl territory. It is of modern introduction, from the upper valley of the Usumacinta river.

§ 3. MATHEMATICAL BASIS OF THE CALENDAR.

The general outlines of this Calendar system are so well known—or rather, I should say, are discussed in so many accessible books—that I need not more than refer to them here.

The basis is a so-called “month” of 20 days. Each day is designated by a name of some object, animate or inanimate; and besides its name, each day is numbered, but not from 1 to 20, but only from 1 to 13, when the numbering begins again at the unit.

The result of this combination evidently is, that a day bearing both the same name and the same number will not recur until 13 of the “months” have elapsed. This gives a period or cycle of 260 days, and this anomalous period is at the foundation of the native Calendar.

Why was it chosen? Does it correspond to any series of recurring events in nature? Is it astronomical? Or was it purely mythical and terrestrial?

The answers to these inquiries are not entirely satisfactory. It is generally admitted that the number 20 was chosen because the arithmetical system of these nations was vigesimal, and grouping the days by twenties was a natural method with them; and it has usually been stated that the number 13 represents one-half the number of days during which the moon is visible between its heliacal conjunctions, and that it owed its selection to this observation.*

An obvious difficulty in this theory is, that according to it the Calendar ought not to take note of the days when the moon is in conjunction, as otherwise after the very first month it will no longer correspond with the sequence of natural events from which it is assumed to be derived; but as these days *are* counted, it would appear, although the lunar relations of the calendar in later days cannot be denied, that it had some other origin.

The month may have been counted from new moon to new moon; but the 26 days in which the moon was actually visible alone have been included in a ritual or ceremonial lunar count, 13 of these being assigned to the waxing, 13 to the waning moon.

* See Orozco y Berra, *Historia Antigua de Mexico*, Tome II, p. 12. Another theory which he suggests is that the 13 may have had reference to the 13 lunar months which approximately make up a solar year.

Dr. Förstemann is of opinion that the 13-day period arose from an effort to divide the vague solar year, counted as 364 days, into equal parts, thus making $13 \times 28 = 364$.*

Another theory, especially urged by the able Mexican antiquary, Paso y Troncoso, is that the period of 260 days and the number 13 owe their selection to astronomical observations of the planet Venus. He points out that 5 synodical revolutions of Venus equal 8 solar years; and that after 13 periods of 8 years, forming a cycle of 104 years, on the initial day of the next cycle the relative positions of Venus and the sun would be the same as at the commencement of the first cycle.†

An entirely different explanation of the selection of the number 13 is that which traces it to certain widespread terrestrial and mythical connections.

Whether these mythical relations were adopted from the Calendar or whether they gave rise to it, they certainly were present in marked prominence among these nations. According to Aztec mythology the heavens were 13 in number, and 13 divinities ruled over the under world. The Quichés and Cakchiquels believed that 13 was the number of the first ancestors of the human race, so they divided their tribes into 13 divisions or *gentes*. And other instances could be quoted of the sacredness of this number.

Whence did it derive this mythical character?

A possible explanation has been suggested to me by Mr. Frank H. Cushing, based on his observations among the Zuñis.

In the ceremonies of this nation the complete terrestrial sphere is symbolized by pointing or blowing the smoke to the four cardinal points, to the zenith and the nadir, the individual himself making the seventh number. When the celestial is also to be symbolized only the six directions are added to this seven, because the individual remains the same. So that the number typifying the whole universe, terrestrial and celestial, becomes 13.

When, on the other hand, in their ceremonies the rite requires the officiant to typify the supra- and the infra-terrestrial spheres,

* "Die Zahl 364 scheint den Anlass gegeben zu haben das Jahr in Perioden von je 13 Tagen zu teilen. Denn die Natur scheint die Zahl 13 nicht geliefert zu haben." *Globus*, Bd. 63, No. 2. 1892.

† See his lengthy and careful study in the *Anales del Museo Nacional de Mexico*, Tomo ii, pp. 350, *seq.*

that is, the upper and the under worlds, the same number, 13, results, as it is held that in each the sun stands for the individual, being in turn the day-sun and the night-sun, the light and the dark sun, but ever the same, and therefore counts but once.

The number 13 possesses certain properties and relations which appear to have recommended it widely for divinatory purposes and games. The Mexican "cycle" was composed of 52 years arranged in 4 series of 13 each; precisely analogous to a pack of our playing cards. These cards can be traced back to primitive games played for purposes of divination; and no doubt the numbers were selected and combined in both instances from the same motives.

The Nahuas certainly regarded the ritual year of 260 days as equivalent to 9 lunations, as they divided it in some of the most important of their Calendars—the celebrated "Tonalamatl," for instance—into 9 equal divisions, ruled over by the so-called 9 "Lords of the Night;" thus $29 \times 9 = 261$; though what they did with the supernumerary day is not clear.*

An ingenious theory of the mathematical development of this Calendar has been offered by Mrs. Zelia Nuttall. It assumes that at the close of each period of $20 \times 13 = 260$ days, 5 intercalary days were inserted before the next 260-day period was technically commenced. This naturally brought its commencement on the next subsequent Dominical day, and also caused the whole period, 265 days, to equal, very nearly, nine lunations. If it can be shown that this intercalation actually took place, Mrs. Nuttall's suggestion will have cleared up one of the most obscure problems in American archaeology.

It seems inherently probable that there was some such very accurate hieratic plan of keeping the time count, as we are assured by many writers that certain native festivals, etc., were observed precisely on days of the year fixed by the European Calendar.†

* On the Tonalamatl see Dr. Seler's very thorough article in the *Compte-Rendu* of the Congress of Americanists for 1888, p. 527, *seq.*

† Dr. Stoll has shown that the Cakchiquels must have subtracted 3 days from the 260 in order to keep their reckoning as we know they did. (*Ethnologie der Indianerstämme von Guatemala*, p. 66. Leiden, 1889.) His comparison of the methods of reckoning time among the Nahuas, Mayas and the nations of Guatemala is highly suggestive.

§ 4. THE 5-DAY PERIODS AND "YEAR-BEARERS."

The sequence of the days is found to be the same in all the Calendars which have been preserved, from whatever stock they have been derived. In all, also, the "month" of 20 days was divided into a series of 4 shorter periods of 5 days each. But here the similarity ends, for these 5-day periods did not uniformly begin on the day which we know was the first of the 20, nor was there any agreement between the various Calendars as to when they should begin. As the counts of the years and cycles were named after and adjusted by these "Dominical days," or, as the Mayas called them, "Year-bearers," this led to a certain confusion.

The differences will be seen in the following table, in which the numbers are those of the 20-day period on which the shorter periods of 5 days began in the several Calendars.

MAYA.	TZENTAL.	QUICHÉ-CAKCHIQUEL.	ZAPOTEC.	NAHUATL
4	3	2	1	3
9	8	7	6	8
14	13	12	11	13
19	18	17	16	18

It will be seen that the only two which agree are the Tzental and the Nahuatl; and the only one which began the 5-day and the 20-day periods on the same day was the Zapotec.

Nevertheless, the fact that the Calendar did begin on the first day of the 20-day period was distinctly recognized by these peoples. It is mentioned concerning the Mayas by Bishop Landa,* and by various writers of the Mexicans. Why and when the change was made remains extremely obscure and has received a variety of explanations at the hands of students.

Orozco y Berra questioned the accuracy of Landa's statement, that the day *Imix* began the count in Maya, and suggested that what his informant meant was, that the day and number of *Imix* were duplicated every four years as a bissextile day, and in that sense began the reckoning.†

Dr. Seler explains the Nahuatl and Maya Dominical days thus: "The day *Acatl*, like *Kan*, belongs to the four chief signs with which the sequence of the years is indicated, and both refer

* Landa, *Relacion de las Cosas de Yucatan*, p. 246.

† *Historia Antigua de Mexico*, Tom. ii, p. 128.

especially to those years which are assigned to the East, the place of beginning."* This does not explain why these days rather than others were chosen as the "Year-bearers," or as the Dominical days. Nor is it accurate to say that the Calendars, when arranged, as was the custom, with reference to the cardinal points, began at the east. Motilinia tells us those of the Nahuas, at least those which he had seen, began with *Tochtli*, which was placed to the south; † and Ordonez y Aguiar, in the scheme of the Tzentel Calendar, which he copied from a native original, begins with *Lambat*, which he also places to the south; ‡ both of these being the eighth day of these calendars.

According to Dr. Förstemann, who has prosecuted such valuable researches into the Maya Codices, the Maya years began with *Imix* until towards the close of the fifteenth or the beginning of the sixteenth century, when the lack of an intercalary day led to a disorder in the reckoning. They then intercalated 17 days, and recommenced the regular account with *Kan*. He is of opinion that the Codex Troano shows the older form of reckoning, the Codex Dresdensis the newer.§

In some correspondence I have had with Prof. Cyrus Thomas, who has given long and fruitful attention to the study of the Maya Codices, he states his entire agreement with Dr. Förstemann that the Dresden Codex "follows the usual method of counting by the four-year series as the *Kan*, *Muluc*, *Ix* and *Cauac* years." As to the statement of Bishop Landa, Dr. Thomas writes me: "As we find several of the time series in the Codices commencing with this day (*Imix*), it is probable that the Indians in explaining to Landa hit on one of these, thus causing him to believe this to be a rule in counting years."

M. de Charencey believes that the Aztecs chose the third day of the series, the Mayas the fourth day, etc., with which to begin the count, because these numbers were specially sacred in these various nations from mythical associations or historic incidents. ||

* *Zeitschrift für Ethnologie*, 1888, p. 42.

† *Historia de las Indias de la Nueva España*, Trat. 1.

‡ *Historia del Cielo y de la Tierra*, MS. This singular work is now in a private library in the United States.

§ See his article, "Zur Maya Chronologie," in the *Zeitschrift für Ethnologie*, 1891, pp. 141, *seq.*

|| Charencey, *Des Nombres Symboliques chez les Tolteques Occidentaux*, p. 19 (1893).

None of the above solutions can be deemed satisfactory. The fact remains, that among all these peoples the first day of the 20-day series was well known and recognized as such; and yet, except among the Zapotecs, it was not used as a Dominical day or a year-bearer. The Nahuas were well aware of this curious discrepancy, and had their own explanation of it, which, of course, is either purely mythical, or so esoteric that its interpretation escapes us. They said that the 5-day periods and the years did originally begin with day 1 and number 1 (*ce Cipactli*), and that this continued from the time of the invention of the Calendar down to the close of the fourth age of the world, a period of 2028 years; but as the fifth or present age began on the 8th day of the series and number 1 (*ce Tochtli*), this was then chosen in place of the former.* This 8th day was therefore placed on the south of the "wheel," and as the count was from right to left, it necessarily brought the 13th day, *Acatl*, to the east, and therefore the true series of Dominical days in the Aztec Calendar would run thus: 8 : 13 : 18 : 3.

Making this correction in this and the other Calendars, we obtain the following as the true sequence of the year-bearers in them, the numbers showing the position of the days in the 20-day series.

MAYA.	TZENTAL.	QUICHÉ-CAK.	ZAPOTEC.	NAHUATL.
4. Kan.	8. Lambat.	17. Noh.	1. Chilla.	8. Tochtli.
9. Muluc.	13. Ben.	2. Ig.	6. Lana.	13. Acatl.
14. Ix.	18. Chinax.	7. Queh.	11. Goloo.	18. Tecpatl.
19. Cauac.	3. Votan.	12. E.	16. Guilloo.	3. Calli.

Here again the Tzental is in accord with the Nahuatl, which diminishes the probability of it being a mere coincidence.

§ 5. THE 7-DAY PERIOD.

The Tzental appears to have developed the number 7 as an arithmetical element in their astronomical system. They had in their Calendars 7 days painted with black figures, the first be-

* See the discussion of the Nahuatl myths on the subject, by Paso y Troncoso, in the *Anales del Museo Nacional de Mexico*, Tom. II, p. 354 *et seq.*, and Orozco y Berra, *Historia Antigua de Mexico*, Tom. I, p. 17. According to Ixtlilxochitl, the Tezucans did not begin with *Tochtli*, but with *Tecpatl*, the latter being the date of the destruction of Tollan. This would give still another series: 18 : 3 : 8 : 13.

ginning with a Friday.* It is not possible from the jejune account we have of this feature to say whether it was based on the European week; or was the result of the subtraction of the 13 days of the native week from the 20 days of the month.

I am inclined to the latter view; for the Tzentsals were not the only nation employing this Calendar who had a 7-day period, although Orozco y Berra, in discussing the subject, asserts that they were.† We have, however, the testimony of Father Thomas Coto to the fact that the Cakchiquels of Guatemala had a period of similar length in their time count, though unfortunately he took so little interest in the subject that he mentions nothing beyond the bare fact.‡ And Father Varea, writing of the same nation, says that they observed a period of 7 days annually in Lent, during which they believed all animals, etc., retired into seclusion. To this period they gave the name *K'apì k'ih*, closed days or days apart, the same term which they applied to the intercalary days.§

The close relation of the 7 period to the 13 period is shown in the traditional history of the Cakchiquels. From the earliest times they were divided into 13 divisions, *K'hob*, and 7 tribes, *Amag'*. These were undoubtedly drawn from the numbers of the Calendar.||

The attention of the native arithmeticians was naturally attracted to the number 7, as in order to know the number of the day in the 13-day list on which a given month would commence, they were obliged to add 7 to the number of the first day of the preceding month. This was the foundation of a series of tables preserved in several of the Maya "Books of Chilán Balam," bearing the title *Buk Xoc*, or General Computation, specimens of which have been given by Piò Perez.¶

* "En muchos pueblos de las provincias de este obispado tienen pintados en sus repertorios o calendarios siete negritos para hacer divinaciones y pronosticos correspondientes á los siete dias de la semana, comenzandola por el Viernes á contar." Nuñez de la Vega, *Constituciones Diocesanas del Obispado de Chiappa*, Lib. I, p. 9.

† Orozco y Berra, *Historia Antigua de Mexico*, Tom. II, p. 160.

‡ "Algunos meses duran veinte dias, y otros siete; que ni los acabaremos de entender, ni ellos se entienden, aunque tienen sus maestros en esta facultad." Thomas Coto, *Vocabulario de la Lengua Cakchiquel*, MS., 1651.

§ "*K'apì k'ih*: Siete dias que suelen caer en la quaresma, en los quales dicen los indios que se recogen todos los animales, montes, etc." Varea, *Vocabulario Cakchiquel*, MS.

|| *Annals of the Cakchiquels*, passim.

¶ In his *Essay on the Maya Calendar*, printed in the *Registro Yucateco* and in Brasseur's edition of Diego de Landu's *Relacion*.

Dr. Forstemann brings evidence to show that the Mayas at one time arranged the days of the solar year in 4 groups of 7 weeks each, each week being the native one of 13 days ($4 \times 13 \times 7 = 364$), and that each of these groups of 7 was assigned to a particular cardinal point.*

§ 6. THE VAGUE SOLAR YEAR.

Whatever might have been its origin or earlier uses, this period of 260 days was no longer at the time of the Conquest the received civil time measure, but was confined to divinary, astrological and sacred purposes. It served to fix the festivals and fasts of religion, and to foretell the fate of individuals and nations.

No doubt these nations, like the northern hunting tribes, had in early times a rude and inaccurate method of noting the solar year, either by seasons, or lunations, or by the regular recurrence of natural phenomena. An effort was made to adjust to this the computation by vigesimal day periods, 18 of which gave 360 days. This still required 5 days every year and 1 more every 4 years to render the count accurate. The 5 days were noted, and annually allowed for as "useless," or uncounted days; but the 1 every 4 years, which we intercalate in our leap year, was probably not recognized in most tribes, and several careful authors think not anywhere. The assertions in reference to this by early authorities are obscure and unsatisfactory.

In spite of the fact that these 20-day periods in no wise corresponded to the lunar months nor were derived from them, they seem to have been very generally called by terms connected with the word for moon, which indicates that at some time they superseded a more ancient system of reckoning the solar year by a series of lunations.

This will be seen from the following examples:

The Cakchiquels, according to Varea, had two expressions for "month," the one, *iq*, evidently allied to *iq*, moon; the other, *atit*, the literal meaning of which is "old woman" (*muger*

* *Globus*, No. 2, 1892. The Nahuatl legend of the "Seven Caves, Chicomoztoc," whence issued their ancestors, and the repeated use of the number seven in the *Popol Vuh*, are other indications of the general sacredness of this number among the tribes under discussion. I have already quoted Mr. Cushing in reference to its meaning in the mythical rites of the Zulus.

vieja). The Mayas spoke of the 20-day period as *u*, the moon or lunar month. The Tzentsals employed the corresponding term *i*, moon or month, and for year the word *avil* from the same root as the Maya *haab*.

There was no uniformity in the date of beginning the solar year. The Mayas were said to have begun it on July 16, the Cakchiquels on January 31, and as for the Quichés, three authorities before me, Ximenes, Gavarrete and a native Calendar, assign respectively February 27, December 24 and February 7. The same uncertainty prevailed everywhere.

§ 7. METHODS OF DIVINATION BY THE CALENDAR.

A study of the methods of divination by the Calendar as employed by these nations would be by no means profitless. To them, this use of it was far more important than as a time count. Man's fears and hopes, all the emotions which prompt his actions, look to the future rather than to the past; and for that reason prophets, when accredited, have ever enjoyed greater popular consideration than historians. We may be reasonably sure that the key to the few ancient Calendars which have been preserved to us, and also to the strange inscriptions on the ruined buildings of Central America, is to be found in astrology rather than in chronology.

The only early writer who enters into this with any degree of fullness is Father Sahagun, who devotes the fourth book of his "History of New Spain" to the judicial astrology of the ancient Mexicans.* Writing a hundred and fifty years later, Bishop Nuñez de la Vega, of the Diocese of Chiápas, states explicitly that the general principles then in use for soothsaying from the Calendar in that district were the same as those practiced in Mexico from the remotest known period; † and that they have

* The information on this subject supplied by Father Duran in his *Historia de las Indias de Nueva España*, Tom. II, App. Cap. II, is, according to his own statements, of doubtful correctness.

† "En cada successo escogian un Dios; y llegó cada uno a tener su *nagual*, y aun muchos, uno solo de astros, elementos, aves, pezes, y brutos animales, y algunos tan viles, y asquerosos, como horniugas, ratones, lechuzas y murelelagos. Este error fué passando y aralgandose tanto en los subseguentes *Nagualistas*, que hasta ol en día se ha practiando por *Reportorios* y *Kalendarios* del primitivo gentillismo, que en la substancia y modo de pronosticar por el numero de 20 y de 13, concuerdan los mas modernos con los mas antiguos, que se practicavan en Mexico; y solo en los nombres significando por los 20 caracteres en cada provincia son diversos, ó por ser diferente los idiomas, ó por no ser unos mismos los que poblaron." Nuñez de la Vega, *Constituciones Diocesanas*, Lib. II, p. 134 (Roma, 1702).

not materially differed down to the present day, is proved by a native Quiché Calendar of 1854, which I have in my possession.

The decisions of the native astrologers as to which days are auspicious or the reverse did not seem to depend on any theories transmitted from nation to nation; although in the Calendars of a given nation there was a prevailing consensus of opinion among them. Thus, Sahagun remarks of the Mexican repertoires, "In general, in all the signs, the tenth and thirteenth days are good," while "the eighth and ninth days are usually bad."* It is consistent with this that we find the 9th days of all the signs chosen by malicious witches and sorcerers as those on which they would be most active in their evil designs.† The same number, 9, appears to have had some special meaning for the Quiché diviners, as in each of their mouths they had 9 good and 9 bad days, the remaining 2 being indifferent.‡ The Aztecs had 6 good days, 7 indifferent and 7 bad.§

The painted paper or skin on which the Calendar was represented by its symbols was taken as a ground on which lots were cast, and as they fell on one or other of the signs, they betokened a fortunate or unfavorable outcome of an undertaking.||

But it was especially to foretell the fate of a new-born child and to select his guardian spirit or *nagual*, that the Calendar was chiefly called in by the priesthood.¶ One name of a child was that of the day of its birth, both the number and the day name being expressed. This gives us those curious personal appellations often recurring in the early Spanish historians, such as Seven Winds, Five Serpents, and the like. Wherever they occur, we may be sure the nation made use of this Calendar.

§ 8. CALENDAR FESTIVALS OF THE MODERN QUICHÉS.

The natives of Guatemala of aboriginal blood continue to reckon by this ancient Calendar, and regulate by it certain recurrent festivals and rites which have little to do with the Christi-

* Sahagun, *Historia de Nueva España*, Lib. iv, Cap. ii, 16.

† Orozco y Berra, *Historia Antigua de Mexico*, Tom. ii, p. 24.

‡ See Seherzer, *Die Indianer Santa Catalina Istlavacan*, p. 15.

§ Diego Duran, *Historia de las Indias*, Tom. ii, p. 259, who names them.

|| Duran, *ubi suprà*, p. 259.

¶ Father Juan de Cordova, who is our only authority for the Zapotec Calendar, explains at length its employment in divination, *Arte de la Lengua Zapoteca*, p. 201, *seq.* I do not extend my remarks on this subject, as I shall examine it fully in an article on "Nagualism," as it prevailed before and after the Conquest among these peoples.

anity to which they are ostensibly adherents. A writer of that country has furnished a description of these, and as the publication in which his article appeared is extremely rare,* and the facts pertinent, I shall quote some of them.

When a day name coincides with the number 8, the day is considered sacred and a rite is celebrated either of the first, second or third order of solemnity, according to its object, for instance :

The day 8 *Camey* is that on which the souls of the departed are prayed for, and the sorcerers implored to keep evil-minded souls from injuring the living.

The day 8 *Kanel* was that on which in ancient times they sacrificed to the divinities of the field and of agriculture. At present, Saint Anthony occupies the place of the dethroned old gods, and to him they offer the first fruits and dance to the sound of the marimba.

On the day 8 *Batz*, which by their count falls in the last month of their year,† there is a sort of general summary of all the festivals of the year, when there is much dancing, much copal burned as incense, much discharge of rockets, the whole closing with a general intoxication of the participants on aguardiente.

The day 8 *Ee* is that devoted to the adjuration of a particular monkey, who is supposed to be seated on one of the hill-tops, and is therefore called "The God of the Hill" (*Dios del Cerro*). The native priests require numerous offerings from the faithful to placate him, which naturally find their way into their own stores.

The day 8 *Ah-mak*, like *Camey*, is set apart to commemorate the dead. The native priests go forth in the evening and call upon them with loud voices, while the mourners tell the spirits thus summoned whatever family news or other incidents they think will interest them.

On the day 8 *Noh* is celebrated a festival dedicated to the house and the family. They call upon the names of their deceased ancestors and place upon the altar which is invariably set up a cup of water in which a piece of money is dropped, which piece will be handed the cura of the parish the next day

* H. Spina in *Boletín de la Sociedad Económica de Guatemala*, Dec., 1870.

† The Calendar to which this refers evidently, like that of the Cakchiquels, drops 3 of the 260 days; otherwise, 8 *Batz* would not always fall in the last month.

to pay for masses for the dead.* A curious feature of the invocations on this day is one to their navel strings, which, at birth, are buried within or close to the house. This recalls an ancient Mexican superstition. †

§ 9. WHERE WAS THE CALENDAR INVENTED, AND BY WHAT NATION?

The comparison I institute throughout the different nations which adopted this Calendar of the names of the 20 days which make up the month, and those of the 18 months which make up the solar year, proves beyond doubt that the former are translations from some one original source, while the latter are almost entirely different in the different nations, and represent, therefore, later developments of the astrological Calendar, and various adaptations of it to the solar years of the several nations.

This fact leads the way to an important historical inquiry: To which one of the many linguistic stocks employing this Calendar must we assign the original form and meaning of the names of the days? Whichever it is, to it we must also assign the first invention of this strange and intricate system which has played so important a part in the development of Mexican and Central American art, thought and religion.

Most of the older authors who credulously accepted the fables of the natives, and those of later date who follow in their footsteps, join in attributing the Calendar to the "Toltecs," who are imagined to have been a mighty people, of high culture, whose "empire" extended far and wide in southern Mexico and Central America. In another publication I have given abundant reasons to disprove this ancient story, and to reduce the Toltecs to the inhabitants of the small town of Tula, north of the city of Mexico. ‡

* Another name for this day is *gua rabalhá*, which I suppose to refer to this ceremony, and to be a compound of *gua*, fountain, spring; *r*, his or its; *balih*, to fill; *há*, house; "the water that supplies the house," or something to that effect.

† At birth, the Nahuas buried the navel string (and placenta) with important ceremonies, as they believed its disposition influenced the after-life of the child. If it was a boy, an arrow and a shield were interred with it, that he might be brave; if a girl, a *metate* and corn-roller were substituted, that she might make a diligent house-wife. See the Codex Mendoza in Kingsborough's *Mexico*, Vol. v, p. 91, and Sahagun, *Historia*, Lib. v, Appendix.

‡ See the article entitled "The Toltecs and their Fabulous Empire," in my *Essays of an Americanist* (Philadelphia, 1890).

Quite different is the opinion of more recent and able archæologists.

In a work published in 1880 the historian of Mexico, Manuel Orozco y Berra, stated that, "without any doubt," the Calendar of the Zapotecs of Oaxaca was the original on which were based and from which were developed all the other Calendars of Mexico and Central America which had as their fundamental relations the periods of 13 and 20 days. He founded this conclusion, not on linguistic grounds, but on the more ancient and primitive character of the Calendar as preserved by the Zapotecs.*

In 1890, consequently ten years later, Dr. E. Seler expressed a similar belief that the Zapotecs were the probable inventors of the Calendar, his reasons being chiefly linguistic and archæological.†

I frankly acknowledge that after carefully weighing all the evidence brought forward by these writers, and much more from my own researches, I have been unable to reach any definite decision on this question; though from various minor indications I think the probability is in favor of the opinion that it was the invention of that ancient branch of the Mayan stock who inhabited the present States of Chiapas and Tabasco, and left still visible proofs of their remarkable culture in the ruins of Ocozingo and Palenque.

In the relics from these ancient cities we find a development of art unequalled elsewhere on the American continent; and to this region the admirable analysis of Mayan antiquities by Dr. Schellhas inevitably points, ‡ as the scene of the definite beginnings of that stock's remarkable cultural evolution.

I have discovered no conclusive or even weighty evidence that we should look to the Zapotecs as the discoverers of the Calendar system; but I am far from denying the possibility that it may hereafter be adduced. It must be borne in mind, however, that we lack the material for studying the Calendar as

* Orozco y Berra, *Historia Antigua de Mexico*, Tomo II, cap. 1 (Mexico, 1880). M. Eugene Boban, in his *Catalogue de la Collection Goupil* (Paris, 1892), quotes and directs attention to Orozco's opinion.

† In the *Zeitschrift für Ethnologie* (Berlin, 1891), and in the *Compte Rendu* of the Seventh Congress of Americanists, p. 735 (Berlin, 1890). I have not observed that he refers to the priority of Orozco y Berra in defending this opinion.

‡ See his article, "Vergleichende Studien auf dem Felde der Maya-Alterthümer," in the *Internationales Archiv für Ethnographie*, Bd. III, 1890.

it was employed by the Mixtecs, a tribe of antique and developed culture, who had employed it for an indefinite period;* and are equally ignorant of its form and names among the Totonacos, who put forth the claim that they themselves had invented it, and had constructed the celebrated pyramids of the sun and moon on the plain of Teotihuacan as a permanent memorial of it.†

The period of 20 days is characteristic of this Calendar; and wherever in America we find the solar year divided into periods of this duration, we may be sure that the local Calendar is based on this ancient divinatory scheme. So far as I know, this does not occur outside of Mexico and Central America. The Peruvians divided their year into lunar months, and the Muyscas or Chibchas of Colombia, although, like the Cakchiquels of Guatemala, they had a year cycle of 20 years, measured each year by 12 months of 30 days each. In the Old World no similar combination of 20 and 13 in a time-count has come to my knowledge.

§ 10. THE LINGUISTIC ANALYSIS.

All who have made a study of this Calendar have appreciated the importance of a close etymological analysis of the names of the days and months. It was, as regards the Nahuatl, attempted by Boturini in the last century and more successfully by those versed in that language at the present day—but still leaving much to be desired.

In the Maya, Don J. Pio Perez paid considerable attention to these etymologies, and so also have Dr. P. Schellhas and Dr. Ed. Seler in Germany.‡ They have left, however, many gaps to fill, principally from their defective resources in a lexicographic appa-

* There are said to be one or two Calendars extant, as yet unpublished, of Mixtec origin. That this nation had a "month" of 20 days bearing the same names as those of their neighbors is evident from the statements in Herrera, *Hist. de las Indias*, Dec. iii, Lib. iii, cap. xiv, and Garcia, *Origen de los Indios*, Lib. v, cap. iv. These give the day names, Wind, Snake, Deer, Monkey, Tiger, Rose, etc.

† Torquemada, *Monarquia Indiana*, Lib. iii, cap. 18. According to the same authority, the first king of the Totonacos bore the name Ome Acati, 2 Reed, which, if true, proves their knowledge of the Calendar at that time.

‡ Pio Perez's translations may be found in various publications, especially in Brasseur's edition of Landa's *Relacion de las Cosas de Yucatan*. Dr. Schellhas' analysis is in the *Zeitschrift für Ethnologie*, 1886, p. 19, *seq.*, and Dr. Seler's in the same periodical, 1888.

ratus for the Mayan stock. In this respect I am more fortunately situated, having access to a number of unpublished vocabularies in the Library of the American Philosophical Society and in my own collection. These include, for the Maya proper, the MS. dictionaries obtained from the convents of Motul and San Francisco, Yucatan, and named from them; for the Tzental the vocabulary of Father Domingo Lara,* and for the Quiché and Cakchiquel the MS. vocabularies of Fathers Varea, Coto, Guzman, Ximenes and Villacañas. For the Zapotec I have depended on an anonymous vocabulary in MS., the published works of the licentiate Belmar, the grammar of Father Juan de Cordova and the *Vocabulario Hispano-Zapoteco* recently issued in the city of Mexico. The Nahuatl is easily accessible through the dictionaries of Molina and Siméon.

With these at hand, I believe I am able to show beyond question:

1. That the day-names in all five of these languages and dialects are substantially identical in signification, and therefore must have had one and the same origin.

2. That in all the Mayan dialects the names belonged already at the time of the Conquest to an archaic form of speech, indicating that they were derived from some common ancient stock, not one from the other, and that, with one or two possible exceptions, they belong to the stock and are not borrowed words. On the other hand, none of the Nahuatl day-names are archaic, which appears to indicate that these received the Calendar at a later date.

3. That the theory of Boturini, subsequently espoused by the Abbé Brasseur and others, that the day-names refer to historic characters, is wholly without foundation.

4. That there is no evidence to connect them with astronomical bodies or processes, but that they seem purely divinatory and mythical.

*This is the writer called by the Abbé Brasseur in his *Bibliothèque Mexico-Guatemallienne*, p. 10, "Ara," and the MSS. he describes are those now in my hands, two in number, copied in 1616 and 1620. Father Lara was provincial of Chiapas in 1556. See Beristain y Souza, *Biblioteca Hispano-Americana Setentrional*, Tom. II, p. 132.

§ 11. ANALYSIS OF THE DAY-NAMES.

List of the Usual Day-Names in the Maya, Tzental and Quiché-Cakchiquel Dialects, and in the Zapotec and Nahuatl Languages (the Dominical days in small capitals).

	MAYA.	TZENTAL.	QUI-CAK.	ZAPOTEC.	NAHUATL.
1.	Imix,	Imox,	Imox,	CHILLA,	Cipactli.
2.	Ik,	Igh,	Ik,	Gui, Ni, Laa,	Ehecatli.
3.	Akbal,	VOTAN,	Akbal,	Guèla,	CALLI.
4.	KAN,	Ghanan,	Kat,	Guache,	Cuetzpallin.
5.	Chic chan,	Abagh,	Can,	Zii,	Cohuatli.
6.	Cimi,	Tox,	Camey,	LANA,	Miquiztli.
7.	Manik,	Moxic,	QUEH,	China,	Mazatl.
8.	Lamat,	LAMBAT,	Canel,	Lapa,	TOCHTLI.
9.	MULUC,	Molo,	Toh,	Niza,	Atl.
10.	Oc,	Elab,	Tzi,	Tella,	Itzcuintli.
11.	Chuen,	Batz,	Batz,	GOLOO,	Ozomatli.
12.	Eb,	Euob,	EE,	Pija,	Malinalli.
13.	Ben,	BEEN,	Ah,	Quii,	ACATL.
14.	Hix,	Hix,	Balam,	Eche,	Ocelotl.
15.	Men,	Tziquin,	Tziquin,	Naa,	Quauhtli.
16.	Cib,	Chabin,	Ah mak,	LOO,	Cozcaquauhtli.
17.	Caban,	Chic,	NOH,	Xoo,	Ollin.
18.	Edznab,	CHINAX,	Tihax,	Goppa,	TECPATL.
19.	CAUAC,	Cahogh,	Cooc,	Appe,	Quiahuitl.
20.	Ahau,	Aghaual,	Hunahpu,	Lao,	Xochitl.

The First Day.

1. Maya, *imix*; 2. Tzental, *imox* or *mox*; 3. Quiché-Cak., *imox* or *moxin*; 4. Zapotec, *chilla* or *chilla*; 5. Nahuatl, *cipactli*.

It is evident that the three Maya dialects have the same word. Pio Perez regarded it as a transposition of *ixim*, maize, while Dr. Seler, following Dr. Schellhas, derives it from the root *im*, a teat or udder, both conveying an idea of fruitfulness.*

The occurrence of *mox* in Tzental, and *moxin* in Quiché-Cak. (the latter given by Ximenes in his *Vocabulario Cakchiquel*, MS.), shows, however, that the radical syllable is not *im*, but *m-x*. This leads me to identify it with the Maya *mex* or *meex*, which is the name of a fish (the "pez arana," "un pescado que tiene

* The figure of a mamma, which represents this day in some of the drawings, is merely ikonomatic. This representation is noted by Dr. Schellhas, *Zeitschrift für Ethnologie*, 1886, p. 22.

muchos brazos”), probably so called from another meaning of *mex*, the beard, often used metaphorically, as *u mex kin*, the rays (beard) of the sun (*Diccionario de San Francisco*, MS.) The change of the vowel, in *mex* to *m̄ix*, is not unusual in Maya. Pio Perez in his *Dictionary* gives, for instance, the old form *benel* to modern *binel*, *pem* to *pim*, etc.

On the other hand, we find in various dialects of the Maya the *i* retained in the word for “beard;” as Huasteca, *itzim*; Chancabal, *itzimal*; Zotzil, *isim*, etc.; thus proving the identity of the two forms.

This identification brings this day name into direct relation to the Zapotec and Nahuatl names for the first of the Calendar. In the former *chiylla*, sometimes given as *pi-chilla*, is apparently from *bi-chilla-beoo*, water-lizard (lagarto de agua); and the Nahuatl, *cipaactli* certainly means some fish or fish-like animal, a sword-fish, alligator, or the like, though exactly which is not certain, and probably the reference with them was altogether mythical.

The Second Day.

1. Maya, *ik*; 2. Tzentel, *igh*; 3. Quiché-Cak., *ik'*; 4. Zapotec, *gui*, or *ni*, or *laa*, or *laala*, or *liaa*; 5. Nahuatl, *checatl*.

The three words of the Maya dialects all mean air, wind, breath, and, metaphorically, life, spirit, soul. So also does the Nahuatl *checatl*, and indeed it may be questioned whether the Maya word is not a form of the radical *eh'* of the Nahuatl.

The Zapotec offers greater difficulties. In that tongue we have *uii*, air, wind; *chiie*, breath; which we may bring into relation with *gui*; and we find *guiiebee*, wind-and-water cloud (nube con viento y agua). Dr. Seler prefers to derive *gui* from *quii*, fire, flame, the notion of which is often associated with wind. *Ni* is apparently the radical of *nici*, to grow, increase, gain life; while *laa* or *laala* is a word with many meanings, as, warmth; heat; reason or intelligence. The sense common to all these expressions seems to be that of life, vitality.

The Third Day.

1. Maya, *akbal*; 2. Tzentel, *votan*; 3. Quiché-Cak., *akbal*; 4. Zapotec, *guèta*; 5. Nahuatl, *calli*.

The Maya *akbal* is a shortened form of *akabhal*, to grow dark, to become night. The Cakchiquel *akbal* signifies dark and, by

transfer, confused. The Zapotec *guèla* also means night, and, by transfer, old, harvest time, etc. These three, therefore, apply to the day a name of the same meaning.

The Nahuatl *calli* means "house," the Tzentan *votan*, "heart." It is not difficult to connect these with the idea of darkness night or old age, on the ground that the house is that which is within, is dark, shuts out the light, etc. Possibly the derivation was symbolic. Votan, as a hero-god, was much venerated by the Tzentals, says Bishop Nuñez de la Vega; he was called "The Heart of the Nation;" and at Tlazoaloyan, in Soconusco, he constructed, by breathing or blowing, a "dark house" (*una casa lóbrega*), in which he concealed the sacred objects of his cult. In this myth, therefore, which I have explained at some lengths in a previous work,* we find an unequivocal connection of the ideas of "darkness" and "house" united in the myth of Votan, indicating the oneness of the origin of all three in this relation. This is proved by the coincidence that Tepeyollotl, which has in Nahuatl the same meaning as Votan in Tzentan, is the god who is patron of this day.†

The Fourth Day.

1. Maya, *kan* or *kanan*; 2. Tzentan, *ghanan*; 3. Quiché-Cak., *k'at* (*k'ate, k'atic, gatu*); 4. Zapotec, *guache*, or *gueche*; 5. Nahuatl, *cuetzpallin*.

All sorts of meanings have been attributed to the Maya day name *kan*; as, hamac, rope, yellow, snake, and, by Dr. Selser, to abound in, abundance, to be in excess, etc. All agree that the Tzentan *ghanan* is the same word under a slightly different form. In Cakchiquel, according to Guzman, *Compendio de Nombres*, MS., *k'an* is the name applied to the female of the iguana, or tree-lizard, and this I believe to be the original sense of the Maya and Tzentan terms, corresponding closely to the Nahuatl *cuetzpallin*, which meant some species of lizard. The Za-

* *American Hero Myths*, p. 217: The word *votan* is the general term in Tzentan for "heart" in both its physical and figurative senses, such as feeling, sentiment, courage, affection, life, etc. Dr. Selser finds in the prefix *o* an indication of the Maya *ol*, Nahuatl *yol*, heart; but it is needless to explain this prefix from foreign tongues. In Tzentan, *yol* means that which is held or owned in common, that which belongs to the community and is common property (*comun cosa, yol; comunidad, yol, otol, oñl*, Lara, *Vocabulario*).

† For a full discussion of this point, see Dr. Selser, in the *Compte-Rendu* of the Congress of Americanists, vii Session, pp. 561-569. He believes the Nahuatl Tepeyollotl was a deity borrowed from the southern nations (Zapotec or Maya stocks).

potec *guache*, translated by Seler as frog or toad, is more than likely to be a variant of *gurache*, or *gorache*, iguana (see *Vocabulario Castellano-Zapoteco*, s. v. Lagarto).

This leaves the Cakchiquel *kat* or *qat* to be explained. Ximenes says it is *cat*, a net for carrying maize, but means lizard. Scherzer states that the present translation of the word among the Quichés is *kat*, fire. The connection probably was symbolic, the iguana being the type of fullness or food, which the net full of maize ears also typified. Precisely parallel to this is the name for this day in the Nahuatl of Meztitlan, *xilotl*, an ear of corn.

The Fifth Day.

1. Maya, *chic chan*; 2. Tzental, *abagh*; 3. Quiché-Cak., *can*; 4. Zapotec, *ci*, or *ziie*, or *guii*; 5. Nahuatl, *cohuatl*.

Pio Perez offers no explanation of the Maya *chic chan*, while Dr. Seler says that "undoubtedly" it means "a sign marked or taken." To give this sense it would have to be read *chech*, a sign or mark; *ch'aan*, something taken or carried away. There is much less difficulty in construing it as *chich*, strong or great, and *chan*, the generic Tzental term for serpent. The Cak. *can* also means serpent, especially the viper, Guzman giving *rawa can*, the green viper; *k'ana qanti*, the yellow viper, and other compounds. The Nahuatl *cohuatl* is the generic term for serpent in that tongue.*

The Tzental *abagh* is a different word. It means in that dialect and in Cakchiquel, luck, fate, fortune (*dicha ó ventura*, Ximenes, *Vocabulario*, MS.). This is identical with the Zapotec *ci* or *zii*, and *gui* (*xi-gui*, *hado ó ventura*; *bi-zi*, *agorar*; *gui*, *ganancia*; *runni-bizii*, *agorar ó creer en el canto de las aves ó culebra*. *Vocab. Castellano-Zapoteco*). As in this last example the serpent is especially noted as the animal whence portents were derived, the close connection of the day-names is obvious.

The Sixth Day.

1. Maya, *cimi*; 2. Tzental, *tox*; 3. Quiché-Cak., *camey*; 4. Zapotec, *lana*; 5. Nahuatl, *miquiztli* or *tzontecomatl*.

The Maya *cimi* is from *cimil*, death, to die; the Quiché-Cak. *camey* means death, or, a corpse; the Nahuatl *miquiztli* = death;

* Dr. Schellhas points out that the Maya sign for this day is derived from the head of a snake (*Zeitschrift für Ethnologie*, 1886, p. 20).

and *tzontecomatl* = a human head cut off, or, a skull. The Tzental *tox* seems to refer to the last-mentioned idea; it means what is separated, sundered, cut off; hence *tox-oghbil*, the axe or hatchet;* *q-tox*, to split, to divide, cut off (Lara, *Vocabulario*, MS.). In this it agrees precisely with the Zapotec *lana*, which the Zapotec Vocabulary renders as a separated part or thing, like a single syllable, word or letter (*silaba ó parte*).†

In this and the previous day-name it is interesting to find the Tzental and Zapotec coinciding, while differing entirely from the other tongues. These analogies have escaped the attention of other students of the subject; and their importance in throwing light on ancient ethnic relations is manifest.

Though the immediate meanings of the various names of the day differ widely, they are clearly connected by the same underlying train of ideas, and indicate unity of origin.

The Seventh Day.

1. Maya, *manik*; 2. Tzental, *moxic*; 3. Quiché-Cak., *queh*; 4. Zapotec, *china*; 5. Nahuatl, *mazatl*.

The Nahuatl, the Zapotec and the Quiché-Cak. words are all the ordinary terms for "deer" in those languages (Zap. *bi-china*).

The Maya *manik*, I am persuaded, is derived, as Pio Perez suggested, from the irregular verb *mal* (*mani*, *manac*, as given in the *Dicc. Motul*), to pass by rapidly, to have a quick, restless motion, and *ik*, wind, the deer being referred to metaphorically by this characteristic trait.‡ Dr. Seler's suggestion, that it is a compound of *may-nik*, cloven hoof, seems more remote.

The Tzental *moxic* offers greater difficulty. It is not easy to accept Seler's suggestion that it is from the Maya *maxan*, swift, for this is a secondary word in that dialect, compounded of the negative *ma*, and means "not slow;" it is not likely that it would be used as a stem word in another dialect. According to Guzman, *Compendio de Nom. en Lengua Cakchiquel*, MS. 1704,

* "*Tox*, hacha para cortar leña," different in form from the "hacha para labrar tierra," called *bat-zil*, to be referred to later.

† Other meanings of *lana* are: the middle; dark; flesh or meat; words; secretly; etc.

‡ The hieroglyphs of this day sign, both in the Maya and Nahuatl, sometimes contain the elements of the sign of the four winds, as has been pointed out by Dr. Schellhas and Dr. Seler.

the Cakchiquels used as the generic word for deer the term *matzat*, evidently from the Nahuatl *mazatl*; and perhaps the Tzental *moxic* is merely a further corruption of the same.

The Eighth Day.

1. Maya, *lamat*; 2. Tzental, *lambat*; 3. Quiché-Cak., *canel* or *kanel*; 4. Zapotec, *lapa* or *laba*; 5. Nahuatl, *tochtli*.

The names of this day differ widely in meaning. The Nahuatl *tochtli* is the ordinary word for "rabbit," and Dr. Seler attempts to trace an analogy by translating the Zap. *lapa* as "the divided (nose)," referring to the rabbit, and then that the Tzental *lambat* and Maya *lamat* are corruptions of this word.

This procedure is unnecessary. The Maya *lamat* is evidently a shortened form of the Tzental *lambat*, which is composed of *lam*, to sink into something soft ("hundirse en cosa blanda," like light loam), and *bat*, the grain, the seed, and the name refers to the planting of the crops.

The Quiché-Cak. *kanel* is the name of the Guardian of the Sown Seed,* probably from *kan*, yellow, referring to the yellow grains of maize. The Zapotec *lāpa* or *laba* means, a drop, and a crown or garland; here probably the latter, in reference to the product of the fields. The rabbit, in Nahuatl, is the symbol of ease and intoxication.

There seems, therefore, a close analogy between these terms.

The Ninth Day.

1. Maya, *muluc*; 2. Tzental, *mulu* or *molo*; 3. Quiché-Cak., *toh*; 4. Zapotec, *niza* or *queza*; 5. Nahuatl, *atl* or (Pipil) *quiahuatl*.

The Nahuatl names mean respectively "water" and "rain;" the Zapotec are also the words for "water." *Toh* was the Quiché name of the god of the thunder-storm, from *tohil*, to sound loudly, to resound, and was thus associated with the rains. The Tzental and Maya *mulu* and *muluc* are from the radical *mul*, to heap up, to pile up; which evidently cannot refer to the "gathering together of waters," as Dr. Seler suggests,

* "Genus der Amsaat" of the natives of Ixtlaynean in Guatemala (Scherzer). On this day the ancient Cakchiquels sacrificed to the gods of fertility and abundance. *Boletín de la Sociedad Económica de Guatemala*, Dec. 15, 1870. In the *Popol Vuh*, the goddess of fertility is called *Xyanll*. Another meaning of *bat* in Tzental is hoe (*hacha para labrar tierra*, Lara, *Vocabulario*).

but rather to the heaping up of the clouds in the sky on the approach of the rains.

Compare the Tzental *toh-cal*, clouds; Mame *muh*, Maya *muh-yal*, clouds (Stoll, *Ethnog. Guatemalas*, p. 59).

The Tenth Day.

1. Maya, *oc*; 2. Tzental, *elab*; 3. Quiché-Cak., *tzi*; 4. Zapotec, *tella*;
5. Nahuatl, *itzcuintlî*.

The Nahuatl and the Quiché-Cak. are the ordinary terms for "dog." Such also, according to Bartolomé de Pisa, is the meaning of the Zapotec *tella*, though I do not find it in this sense in the Vocabularies.* Probably it refers to some particular species.

The Maya *oc* has a variety of meanings, as, a foot or footprint; a handful; an entrance (from the verb, *ocol*, *ocoltah*, *ocolle*, to go in); a theft or thief (from the verb, *ocol*, *oclah*, *ocle*, to steal). I am inclined to believe that the last-mentioned sense was intended, the dog being characterized as "the stealer," as this seems to be the signification of the Tzental *elab*. The two words given by Lara for "theft" (*ladroncio*) are *elec* and *ochol*, in which we can scarcely fail to recognize the two names of the day in these two dialects. The dog steals in and carries off the meat whenever he gets a chance. The Mayas adopted the term from the stem *ochol*, because this was the word for theft in their dialect, in which the stem *elec*, common to the Tzental, Zotzil, Cakchiquel and Quiché, does not appear.†

The Eleventh Day.

1. Maya, *chuen*; 2. Tzental, *batz*; 3. Quiché-Cak., *batz*; 4. Zapotec, *loo*;
5. Nahuatl, *ozomatlî*.

The Nahuatl is the term for "monkey;" *batz* in Quiché, Cakchiquel and Tzental also means monkey, specifically a dark-haired, bearded variety. In the Tzental, according to Lara's Vocabulary, another species is called *chîu*, and this unquestion-

* "En el pueblo de Coatlan tenian un Cazique que se llamaba *Petella*, que significa *perro*," etc. Herrera, *Decadas de Indias*, Dec. iii, Lib. iii, cap. xiv. This chief was one of the Zapotec rulers who secretly continued the ancient rites after the introduction of Christianity. Dr. Seler attempts to obtain the meaning "dog" by supposing *tella* is derived from *tce-lao*, "mouth downward," referring to some myth of a dog falling from the sky. This seems strained.

† The common term for "wolf" in Tzental and Zotzil is *ocquil*.

ably is the origin of the Maya *chuen* (a word which has no signification in that dialect) and of the name *chouen* in the National Book, the *Popol Vuh*, of the Quichés.*

The Zapotec syllable *loo* is given as the name of the 11th, the 14th and the 20th days, but is probably an abbreviation of different words. Taken alone, it has various meanings, as, face; eyes; above; point; beginning, first, etc. Here it may be intended for *bil-loo*, monkey, as the form of the name generally given in Cordova's Calendar is *pel-loo*.

The Twelfth Day.

1. Maya, *eb*; 2. Tzental, *euob*; 3. Quiché-Cak., *e* or *ee*; 4. Zapotec, *píja*; 5. Nahuatl, *mállinalli* and *ítlan*.

The Nahuatl and Zapotec names both signify the brush or broom of twisted twigs or stiff grass used for cleaning and dusting, and this grass itself.

In Maya, *eb* is the plural of *e*, which means points or ends, like those of pins, or thorns (*puntas como de alfiler, aguja, espina y cosas asi, Dicc. Motul*), and plainly was intended to designate the broom by reference to its numerous points. From the same idea, rows of teeth received the same name. The Tzental and the Quiché names, *e* and *euob*, the latter a plural, were from the same radical and had the same signification. All five, therefore, conveyed similar ideas, and it is noteworthy that the day-name *ítlan*, used in Meztitlan, is from *tlantli*, tooth.†

The Thirteenth Day.

1. Maya, *ben*; 2. Tzental, *ben*; 3. Quiché-Cak., *ah*; 4. Zapotec, *quii*, or *i*, or *laa*; 5. Nahuatl, *acatl*.

The Nahuatl means reed or stalk, as do also the Zapotec *quii* and *laa*. The Quiché-Cak. *ah* denotes a green cornstalk or sugar cane (*la caña ó la caña dulce; ó mais tierno, Xinenes*). The Tzental and Maya *ben* has been more difficult to analyze. Pio Perez and Dr. Seler expressed themselves at a loss to offer

* The brothers Hun Batz and Hun Chouen were conquered and transformed into monkeys by the victors. *Popol Vuh*, p. 119. The present pertinence of this myth is that it shows that the words *batz* and *chouen* were both understood to refer to species of monkeys by the Quichés.

† Though it may possibly be a shortened form of *ítlan*, the name of a plant used in making such brooms. Comp. Sahagun, *Historia de Nueva España*, Lib. xi, cap. vii.

a satisfactory rendering of it. I find, however, that in Tzentäl the dried cornstalk (*caña de mais seco*) is called *cagh-ben*, and from this I doubt not this day-name in that dialect and the Maya was taken and syncopated. The verb *ben* or *been* in Tzentäl means "to walk, to go;" but in the above compound the *ben* is from the Maya stem *benel*, to be used up, to be dead (*faltar ó quedar algo por hacerse de lo que se hacia, morirse, Dicc. Motul*).

We thus obtain substantially the same meaning for all the names of the day.

The Fourteenth Day.

1. Maya, *ix* (*gix, hix*); 2. Tzentäl, *hix*; 3. Quiché-Cak., *balam* or *hix*;
4. Zapotec, *eche*; 5. Nahuatl, *ocelotl*, or (Pipil) *teyollocuani*.

The Nahuatl name *ocelotl* means tiger, as does the Zapotec *eche* and the Quiché *balam*, referring of course to the American tiger or jaguar.* The Pipil *teyollocuani*, literally "soul-eater," means sorcerer, as does the Maya, Tzentäl and Cakchiquel word, *hix* or *ix*. The power of transforming themselves into a tiger was one of the peculiar faculties of the sorcerers; hence they were called by the Quichés, *balam*, which means both tiger and to transform one's self into one (*Balam: tigre, ó hacerse tigre, Ximenes*).

It is probable that *ix* is a variant of *ik'* or *igh*, wind, breath, life, as Lara gives: "*Vuch-igh, ó Vuch-ix, hechicero que cura soplando,*" in which *vuch* is to blow, as the medicine man through a tube; and *igh* is air, wind, etc. In the medicine rites over most of the continent, and especially in Central America, blowing upon the part or in a certain direction was the leading ceremony.

The Fifteenth Day.

1. Maya, *men*; 2. Tzentäl, *tziquin*; 3. Quiché-Cak., *tziquin*; Zapotec, *naa* or *ñaa*;
5. Nahuatl, *quauhtli*.

The Nahuatl *quauhtli*, eagle, and the Tzentäl and Quiché *tziquin*, bird in general, are sufficiently alike to show a common origin.

The Zapotec *naa* is identified by Dr. Seler with *naa*, mother; but I believe it is from the widely extended root-word, *na* or *ña*,

* The full form in Zapotec is *be-eche-guia*.

to know, to understand, to be able through knowledge. In this sense it exactly corresponds to the Maya *men*, which means to understand, to be able to do (*men*: entender algo, hacer algo, *Dicc. Motul*). Hence, in this latter tongue, *ah-men* means the man of knowledge, the wise one, the master of wisdom.* The bird, as the symbol of wisdom and knowledge, was familiar to the mystical lore of these peoples.

The Sixteenth Day.

1. Maya, *cib*; 2. Tzental, *chabin*; 3. Quiché-Cak., *ahmak*; 4. Zapotec, *guilloo*, or *loo*; 5. Nahuatl, *cozcaquauhltli*, or (Pipil) *tecolotl*, or (Meztitlan) *teotl itonal*, or *temetlatl*.

The Nahuatl names of this day mean: *cozcaquauhltli* (from *quauhltli*, eagle; *cozcall*, necklace), the ringed vulture, *Sarcorampus papa*, or "royal zopilote" of the ornithologists, a handsome bird with a ring of red feathers around its neck; *tecolotl*, the owl; *teotl itonal*, the day god, or the sun god; *temetlatl*, the pestle or corn-crusher. The Zapotec, which Cordova gives also in the forms *pillaloo*, *peoloo*, etc., is likely to be for *ba-loo*, crow or raven. The Quiché *ahmak* means "the master of evil," which appears to be a reference to the owl, which was esteemed a bird of evil omen and bad fortune by these peoples †—a metaphorical rendering therefore of the Pipil *tecolotl*.

The Maya *cib* is assigned by Pio Perez the meaning "wax," or "copal gum," and is derived by Dr. Seler from *cii*, something that smells or tastes good, as spice or incense. I believe it to be merely another form of *tzib*, to paint (*tzibal*, cosa pintada de muchos colores), and that it refers to the brilliant neck and head feathers of the ringed vulture.

The Tzental radical *chab* means honey, wax, a bee, a late meal, to fast, syrup, to end or cease, to remain, mourning, funeral rites. It is not easy to select from such an abundance. In the

* As the Zapotec *beent chi na*, "man of knowledge." Another meaning of Zap. *ñaa* is "hand."

† For examples see my *Essays of an Americanist*, pp. 114, 169. The Nahuatl *tlacu-tecolotl*, "man-owl," meant a necromancer, one who worked injury. See Sahagun, *Hist. de Nueva España*, lib. iv, cap. xl. Dr. Seler translates *ah-mak* by "der die Augen aufrisst," but in this he has mistaken the word *mak*, evil, for *mah* (arrebatar, Villacufias, *Vocabulario*, MS.). But I observe that Dr. Stoll gives as the Chontal word for zopilote, *ajmua* (*Zur Ethnographie Guatemalas*, p. 54). The adjective *mak*, bad, is a compound of *ma lek*, not good.

Cakchiquel, *chab* means arrow, and to shoot one; also to open the mouth; while *ch'ab* is mud, clay, mire. As red and black clays were the primitive pigments, this last may connect the Tzentel day name with the Maya.

The Seventeenth Day.

1. Maya, *caban*; 2. Tzentel, *chic*; 3. Quiché-Cak., *noh*; 4. Zapotec, *xoo*; 5. Nahuatl, *ollin*, or (Meztilan) *nahui olli*, or (Pipil) *tecpila nahuatl*.

The Maya *caban* has been explained by Dr. Seler diversely as "what is below," or "brought below," and again as "above," "what is above," "heaven," etc. Pio Perez offered no explanation of it. I derive it from the Maya radical *cab*, might or strength (la fuerza, rigor, ó fortaleza de alguna cosa, *Dicc. Motul*). In this sense it corresponds precisely in meaning with the Tzentel *chic* (= Maya, *chich*, cosa fuerte y dura), the Quiché-Cak. *noh*, strong, great, and the Zapotec *xoo*, which has the general signification of force, power or might (comp. Cordova, *Arte Zapoteca*, p. 114).

The Nahuatl *ollin* or *olin* means motion or movement, the result of force applied, as *in tlalli olini*, the earth moves, an earthquake. *Nahui olin*, "the four movements," is an expression which refers to the apparent movements of the sun.

The Eighteenth Day.

1. Maya, *edznab*; 2. Tzentel, *chinax*; 3. Quiché-Cak., *tihax*; 4. Zapotec, *gopaa*; 5. Nahuatl, *tecpatl*.

The Nahuatl term means flint, especially the flint stone knife used in sacrificing to cut the victim. The Zapotec *gopaa*, which Dr. Seler derives from *rogopa*, cold, is more likely to be a variant of *guipa*, a sharp point or edge, whence the word for stone knife, *gueza-guipa*, from *guia*, stone.

The Tzentel *chinax* is an old or sacred form for the usual *zninax*, knife (Lara); and the Cakchiquel *tihax*, the literal meaning of which is, according to Ximenes, "it bites, seraping" (muerde rasgando), would seem to be a figurative and highly correct expression for such an implement.

There remains the Maya *edznab*. Pio Perez offers no explanation of it, while Dr. Seler suggests that it may be from the

root *edz*, hard, solid. It appears rather to be a figurative expression for the sacrificial knife, from *nab*, something anointed or blood (*cosa ensangrentada*),* and *edz*, to adjust, to point, to sharpen (as in the phrase, *edzcabte a tokyah*, punta la lanceta para sangrar, *Dicc. Motul*). Thus, the same signification underlies these various names.

The Nineteenth Day.

1. Maya, *cauac*; 2. Tzental, *cahogh*; 3. Quiché-Cak., *caok*, or *cook*; 4. Zapotec, *ape*, *appe*, or *aape*; 5. Nahuatl, *quiahuítl*, or (Pipil) *ayotl*.

The three Maya dialects present obviously the same word. The Tzental has been by some writers erroneously spelled *cahogh*, and Dr. Seler, following this false orthography, obtains for it the extraordinary meaning, "the darkness descending and overspreading the Earth!" Nuñez de la Vega gives *cahogh*, and no other form. It is a pure Mayan word, meaning "lightning and thunder," the concomitants of the electrical storm. The Pokomechi and Pokomam have precisely this form, *cahok*, *cohoc*; Lara gives the Tzental *chauc* (relampago, trueño, tronido, *Vocabulario*, MS.), the Chontal *chauoc*; the Huasteca, *tzoc*, proving that it is an ancient radical of this family, as this is the remotest of the Mayan dialects.

The Zapotec *ape*, *api*, etc., which Dr. Seler translates "cloud covered," evidently means the same, as we see in the words *laari-api-niza*, *ri-api-laha*, translated "relampago, relampaguear," in the *Vocabulario Castellano-Zapoteco* (Mexico, 1893).

The Aztec *quiahuítl* is the ordinary word for rain; while the Pipil *ayotl* means turtle, which is quite in correspondence with "lightning" as the day-name, this being, as Dr. Schellhas has so well shown, the "lightning animal," *das Blitzthier*.†

* To confirm this rendering, I add that Sahagun specially states that the *tecpall*, or flint, was represented in the Mexican Calendars "stained with blood for the half of its length," *Historia de la Nueva España*, Lib iv, Appendix. It was the *iztapaltotec*, "pedernal ensangrentado" of the *Codex Telleriano-Remensis*, Linn. xxxii.

† Dr. Schellhas points out that in the Maya pictography the turtle is a sign of the lightning, or the thunder-storm. It is associated with the hieroglyphs of the months Kayab and Pop. See his article, "Die Göttergestalten der Maya Handschriften" in the *Zeitschrift für Ethnologie*, 1892, p. 120. It is not easy, at first sight, to understand why so proverbially slow an animal should become the symbol of the lightning. My explanation is that it is an example of the "ikonomatic" method. The Mayan term for lightning is *cooc*, or *eaoc*; the word for turtle is *coc*; from the similarity of the sounds, the turtle was used in the picture writing to mean "lightning."

The Twentieth Day.

1. Maya, *ahau*; 2. Tzentel, *aghual*; 3. Quiché-Cak., *hun ahpu*; 4. Zapotec, *lao*, or *loo*; 5. Nahuatl, *xochitl*, or (Meztitlan) *ome xochitonal*.

The Maya word means ruler or chieftain, literally, "the master of the collar," *i. e.*, the insignia of office; * the Tzentel *aghual* is from the same root and signifies "sovereignty;" the Quiché *hun ahpu*, the One Master of Power, conveys a similar idea. The Nahuatl *xochitl*, flower or rose, is explained in its real sense by the *xochitonal* of the dialect of Meztitlan, "the flower of the day," *i. e.*, the sun. This has been fully shown for the Nahuatl by Dr. Seler, and there is no doubt but that the "ruler" referred to by the Maya dialects is specifically the sun, the day god.

The Zapotec *lao*, or *loo*, here has the meaning "eye," that is, in reference to the sun as "the eye of the day," precisely as in the Maya expression *Kin ich*, which I have elsewhere explained.†

All the names of the 20th day, therefore, convey the same esoteric signification.

A careful examination of this list of day-names shows that at least in eight instances (Days 1, 2, 7, 11, 13, 17, 18, 19) the names are merely translations of the same word; and that substantially in all the remainder, the differences which exist arise from using a figurative instead of a literal rendering of the name.

There can be no question therefore but that the Calendar names had one and the same origin; but in which of the three linguistic stocks represented the list offers no positive evidence. The Zapotec, which is the language geographically intermediate between the Maya dialects and the Nahuatl, agrees with the latter in five instances where it disagrees with the former; and agrees with the Maya in three instances where it disagrees with the Nahuatl names. Three times the Zapotec agrees with the

*The derivation of *ahau* from a theoretical root *ahu*, as proposed by Dr. Seler, is unnecessary; *ah-auh*, "the collar-bearer," because this was a symbol of authority (compare the stone collars from Porto Rico, etc.), remains the most plausible etymology.

†The full expression is *Kin-ich-ahau*, Lord of the Eye of the Day, which explains this day-name, *Ahau*. See my *American Hero Myths*, pp. 153, 158

Tzental, where both disagree with all the other dialects. But these instances do not justify any conclusion. The possibility remains that all five of the lists are derivatives from some older and now lost series of day-names, such as we know existed among the Mixtecas and among the Totonacos, tribes of ancient culture, who made use of this Calendar at a remote date.

In all five instances there is evidence that at the time of the Conquest there was considerable uncertainty among the natives themselves as to the derivation and literal meaning of many of these names. Either they belonged to a much older and forgotten stratum of the tongue, or to a priestly and esoteric form of speech, such as has been found among many native tribes on the continent. But this esoteric speech is nearly always largely archaic.

§ 12. ANALYSIS OF THE MONTH-NAMES.

While the names of the twenty days of each month are practically identical in all the five languages under consideration, the reverse is the case with the names of the eighteen months which made up the vague solar year. These differ widely in tribes very closely related, as the Quichés and Cakchiquels; and even in the same dialectic area, as among the Nahuas. The month-names of the last-mentioned have been carefully analyzed by various writers, notably Dr. Seler, and I have not found the names of the Zapotec months; so I shall confine myself to an examination of them in the Maya, Tzental, Cakchiquel and Quiché dialects, and in the language of the Chapanecs, in which the month-names, but not the day-names, have been preserved.

THE MAYA MONTHS.

The earliest authority for the names of the Maya months is the Bishop Diego de Landa in his well-known description of Yucatan, composed about the middle of the sixteenth century.* Another list, not differing materially, was published by the Yu-

* Landa, *Relacion de las Cosas de Yucatan*. An edition with a French translation by the Abbé Brasseur (de Bourbourg) was published at Paris in 1864. One more correct and complete, in Spanish only, appeared under the editorship of Juan de Dios de la Rada y Delgado at Madrid, in 1884. For a comparison of these, see my "Critical Remarks on the Editions of Diego de Landa's Writings," in the *Proceedings of the American Philological Society*, 1887.

catecan antiquary, Pio Perez, copied from the books of Chilan Balam in his possession.*

An examination of these names shows that they are materially different from those in use among the other tribes of this stock. They appear, in Yucatan, to have reference generally to the religious festivals and ceremonies recurring at certain seasons; while in the other branches of the stock, they usually indicate the seasons or the appropriate periods for agricultural operations.

Months of the Maya Calendar.

1. Pop.	10. Yax.
2. Uo.	11. Zac.
3. Zip.	12. Ceh.
4. Zodz.	13. Mac.
5. Tzec.	14. Kan kin.
6. Xul.	15. Moan.
7. Yax kin.	16. Pax.
8. Mol.	17. Kayab.
9. Chen.	18. Cum ku.

Derivation.

1. *Pop.*—Literally, a mat or rug. But in its metaphorical sense in most Maya dialects, the community or commonwealth. Thus *popol na*, the public buildings, people's house; *popol vuh*, the national book, etc. As the name of the first month of the year it probably refers to the great national festival which then took place as described by Landa, p. 276, sq.

2. *Uo.*—Usually translated "frog;" there is a large edible species so called, who croak in a melancholy way (*dan gritas muy tristes*, *Dicc. Motul*). It is also the word for the fruit of the pitahaya, *Cereus trigonus*; in Tzental, *uanac*. The frog was the symbol of water and the rains.

3. *Zip.*—Pio Perez says there is a tree called *zip*. I can find

* Don Juan Pio Perez gave a copy of his essay to Mr. John L. Stephens, who published it (imperfectly) in the Appendix to his *Travels in Yucatan*. Later it appeared in the *Registro Yucateco*; from which it was copied by the Abbé Brasseur into the volume containing his edition of Diego de Landa.

The "Books of Chilan Balam" are the sacred books of the modern Mayas. I have described them at length in an article in my *Essays of an Americanist* (Philadelphia, 1890).

none such in my authorities. The real significance of the name is revealed by that of the goddess of hunting, in whose honor the festivals of the month *Zip* were held. This was *Zuhuy Zip*, the virgin *Zip*, her name being properly *Dzip*, to skin, to dress slain animals (see Landa, p. 290).

4. *Zodz*.—Also given *Tzoz* and *Zolz*. Probably the correct orthography is *Dzoz*, which means to be seated, as in waiting; Landa stating that in this month there was no festival, but merely preparations for one which was to follow. Another meaning of *Dzoz* is the setting or brooding of birds. *Zodz* is the generic term for the bat; there are no words *Zolz* or *Tzoz*.

5. *Tzec* or *Zeec*.—In this month the bee keepers held their annual fast and festival. The word *Tzec*, to admonish, to correct by chastisement, apparently refers to some religious penance which was then practiced. In Tzental, *Tzec* means scorpion.

6. *Xul*.—Means end, conclusion. At the end of this month, on its last day, at the close of the five days' feast of *chiich kaban*, "the calling down of the Great Hand," the chief god of the Mayas, *Ku kul can*, was believed to descend from heaven and accept the offerings presented to him by the faithful (Landa, p. 302).

7. *Yax kin*.—A compound of *yax*, blue or green (the Mayas not distinguishing between these hues); and *kin*, sun, day or season. This month was largely passed in a religious exercise called *olob dzab kam yax*, "giving the hearts to the service of the blue." All instruments, weapons and utensils, and even the doors of the houses, were then stained with a blue dye (Landa, p. 303). These were therefore the "blue days." The form *Dze yax kin*, given by Pio Perez is explained by the *Dicc. Motul* as the height of summer, probably from the blueness of the sky at that season.

8. *Mol*.—From the verb *mol*, to come together *en masse*, referring to the general reunion, *fiesta general*, which Landa tells us was celebrated in this month, when even the little girls were

present, brought under the care of an old chaperon known as the *ix mol*, "conductress of the crowd."

9. *Chen* or *Cheen*, properly *Ch'een*.—Derived by Pio Perez from the word for well or spring, but properly from a homonymous root which means, to be quiet, to keep silence, referring, I take it, to the solemn action of renewing the gods or making new idols, which took place in this month; a work, says Landa, they undertook with great fear—*con mucho temor*.

10. *Yax*.—In this month occurred the cleaning and renovation of the temples and the installation of the new gods. Hence *yax* is here used in the sense green, fresh, new or first, with reference to this function.

11. *Zac*.—In this month an important rite was celebrated by the hunters in expiation of the blood shed in the chase. As in the native symbolism white signifies peace and propitiation, the month probably derived its name, *zac*, white, from this rite.

12. *Ceh*.—The common word for deer or any large food game. Landa does not assign any festival to this month, but the name probably has reference to that of the hunters just referred to.

13. *Mac*.—In this month the Mayas celebrated the rite of *tup kak*, "extinguishing the fire," for the purpose of securing abundant rains for the harvest. A fire was built in the court of the temple, the hearts of various animals thrown into it, and as soon as they were consumed the priests poured water upon the flames and extinguished them (Landa, p. 254). The root *mac* means to cover, or, a cover, the rite being a "couvre-feu," or covering up of the fire.

14. *Kan kin*.—Translated by Pio Perez "yellow sun," "because in this month, owing to the forest fires, the sun looks yellow through the smoke in the air."

15. *Moan*, or, *Muan*.—Rainy or cloudy. Pio Perez adduces the term *moan kin*, cloudy day, threatening to rain. The word is not in the old dictionaries, but it is doubtless from the same

root as *manaal*, which the *Dicc. Motul* explains as "aguaceros que vienen antes de que entran las aguas de golpe, con los cuales suelen florecer arboles, matas y yerbas." *Muyal* in Maya means "cloud."

16. *Pax*.—The principal feast in this month was called *pacum Chac*, the recompense or repayment of *Chac*, the gods of rain. The name was probably derived from this term; though it may be from *paxah*, to play upon a musical instrument, as Pio Perez suggests, with reference to the music of the festival.

17. *Kayab*.—From *kay*, to sing, to warble; applied both to persons and birds. No festival is assigned to this month.

18. *Cum ku*.—Translated by Pio Perez as a loud and distant noise like thunder, etc. No such derivation is supported by the old authorities. *Cum*, in Maya, is an earthen jar or pot, Nahuatl, *comitl*; *cum ku* is the potter's furnace in which such jars are burned (*Dicc. Motul*); but as *ku* also means "god," *cum ku* is the god of the vase or jar, the deity so often represented in Maya and Nahuatl art, reclining on his back and holding a vase in the centre of his stomach (Le Plongeon's *Chac mol*, etc.). He was the god of the rains, this month being at the height of the rainy season.

THE TZENTAL MONTHS.

The original authority for the names of the Tzental months is Fr. Juan de Rodaz, in his *Arte de la Lengua Tzotzlem ó Tzincanteca*, 1688, MS., a copy of which was in the possession of the late Abbé Brasseur de Bourbourg, but which I have not seen. It would appear that the Zotzils and Tzentials had the same month-names. We have, further, the testimony of a Mexican writer, Emetorio Pineda, who says that at the time he wrote, 1845, the natives continued to divide the solar year into eighteen months, the names of which he gives.* Their use, he states, was to arrange for their agricultural operations, and to fix the dates for their overt or secret religious rites.

* Pineda, *Descripcion Geografica de Chiapas y Soconusco*, pp. 111, sq. (Mexico, 1845).

The order and the names which he gives are as follows :

Months of the Tzental Calendar.

1. Tzun.	10. Elech.
2. Batzul.	11. Niehquin.
3. Si sac.	12. Sban viniquil.
4. Mucta sac.	13. Xchibal viniquil.
5. Moc.	14. Yoxibal viniquil.
6. Olalti.	15. Xehanbal viniquil.
7. Ulol.	16. Poin.
8. Oquinajual.	17. Mux.
9. Veh.	18. Yan kin.

Derivation.

1. *Tzun*.—Allied to the Maya *chun*, the beginning; *dzunul*, to begin; so called from being the first month of the Tzental year (about April 1). Or from *Zotzil tzunel*, to sow (sembrar, Ferraz, *Lenguas Indigenas de Centro-America*, p. 57).

2. *Batzul*.—The Tzental word *batz* means a species of monkey which make a howling noise and are bearded; *batzil* means native, as opposed to foreign, e.g., *batzil tah*, a knife of native manufacture; but I would not derive the month-name from either of these; rather from *bat*, the word in Tzental and Maya for grain, seed, etc., referring to the month in which the seed-corn was prepared.

3. *Si sac*.—For *tzi zac*, “little white;” probably, as in the Quiché Calendar, from the blossoming of certain white flowering plants at this time.

4. *Mucta sac*.—“Great white,” referring to the increasing abundance of flowers.

5. *Moc*.—Pineda says this signifies the month in which the fences of the cornfields were made. It is evidently the Maya *moc*, to fasten together, whence the Tzental *macteibil*, wooden fence (*cercado de palos*, Lara, *Vocabulario Tzendal*).

6. *Olalti*.—This and the two following months were those in which the corn was planted. Both *olalti* and *ulol* appear

related to the noun *aua*, planting, and the verb *xaua*lighthon, to plant. In Zotzil *ololak'* is to produce, to bring forth.

7. *Ulol*.—See the preceding name.

8. *Oquinajual*.—Probably “the planting time,” from *aua*, planting, and *quin*, time, day, season.

9. *Veh* or *ueh*.—Pineda’s note here is: “In this month the plants are attacked by diseases.” The name is plainly from the verb *uehel*, applied to the premature falling of leaves and fruits (caerse la semilla y granos y las hojas de los arboles, Lara, *Vocabulario*).

10. *Elech*.—Pineda remarks, “the healthy winds arrive.” The name is a compound of *ochel*, west, and *ihc*, wind, these being dry and salubrious.

11. *Nichquin*.—This name, observes Pineda, “indicates the flowering season.” It is the Tzental word *nichim*, flowers, from *xnich*, to flower, and *quin*, day, season.

12. *Sban viniquil*.—The word *viniquil*, *vinquilel*, or *vinaquin* means time, period or season. This and the three following months, called respectively the first, second, third and fourth seasons, are understood by Pineda to refer to the four periods of the growth of the maize, the first that of fecundation, the second of the formation of the grain, the third when it is in milk, the fourth when the grain hardens. This seems an error, as it does not require in that latitude eighty days for these changes after the fecundation of the ear. No doubt it refers to the ripening of the various plantings, and so the expressions are understood by Lara: “*ox vinaquin ixim*, mais que se hace en 60 dias.”

13. *Xchibal viniquil*.—“Second season.” See above.

14. *Yoxibal viniquil*.—“Third season.” See above.

15. *Xchanbal viniquil*.—“Fourth season.” See above.

16. *Poin*.—“In this month,” observes Pineda, “the beehives should be emptied and the harvests gathered.”

17. *Mux*.—"This name," says Pineda, "indicates the approach of cold." This suggests a derivation from the Tzental *q'muc ba*, to cover one's self; which is confirmed by the similar meaning of the Cakchiquel month-name, *Pariche*, which see.

18. *Yax quin*.—From *yax*, green or new; *quin*, day or season. Pineda remarks that it is the season of Easter, thus showing that the Tzental year began about April 1.

THE CAKCHIQUEL MONTHS.

The names of the Cakchiquel months are furnished by several old authorities, as by Father Varea in his *Vocabulario*, MS., and Father Coto in his similar work.* There are also extant several native Cakchiquel Calendars, a careful copy of one of which, bearing the date 1685, is in my possession.

The names of both the Cakchiquel and Quiché months, with proposed translations, were published by Señor Gavarrete in his school Geography of Guatemala, edition of 1868, but this portion is omitted in all other editions of that work.†

There is considerable confusion in the Spanish authorities about the sequence of the Cakchiquel and Quiché months; for this reason I have not followed any of them, but have adopted the sequence as given in the Calendars in my possession composed and written by the natives themselves.

Months of the Cakchiquel Calendar.

1. Tacaxepual.	10. Rucab tok'ik'.
2. Nabey tumuzuz.	11. Nabey pach.
3. Rucab tumuzuz.	12. Rucab pach.
4. Cibixic.	13. Tziquin k'ih.
5. Uchum.	14. Cakan.
6. Nabey mam.	15. Ibota.
7. Rucab mam.	16. Katie.
8. Lik'in k'a.	17. Izcal.
9. Nabey tok'ik'.	18. Pariche.

* Both these MSS. are in the Library of the American Philosophical Society, Philadelphia.

† *Geografía de la República de Guatemala*, p. 82. Segunda Edición (Guatemala, 1868).

Derivations.

1. *Tacaxepual*, or *Tecorexepual*, or *Tequexepual*.—The best authorities agree that this was the first month of the Cakchiquel year, and the first corn planting (*tiempo principio de año ó tiempo de sembrar las primeras milpas*. Varea, *Vocab.*, MS.). The word is clearly a corruption of the name of the second month in the Nahuatl Calendar, *Tlaca Xipeualiztli*.

2. *Nabey tumuzuz*.—The first *Tumuzuz*. Father Varea states that this month was at the beginning of the winter rains, and that it derived its name from a species of flying insect which then made its appearance (*viene quando empiezan los primeros aguaceros del invierno*. Aparcan y andan volando unos gusanillos que llaman *tumuzuz*. *Vocabulario*, MS.).*

3. *Rucab tumuzuz*.—The second *Tumuzuz*.

4. *Cibixic*.—From *cib*, smoke, mist or vapor. Varea observes that the natives were accustomed to plant in this month, and that it follows *tumuzuz*. It derived its name from the smoky appearance of the atmosphere at this season, or from the custom of burning brush in clearing the ground. Compare the Maya month *Kan kin*.

5. *Uchum*.—"Season for replanting." Father Coto describes it as the month for planting gardens (*bueno para hacer almazigos y sembrar ortaliza*. *Vocabulario Cakchiquel*, MS.). The derivation is obscure. The root *uch* means a species of fox; a louse; gum copal; and chills and fever. In the neighboring dialect of the Tzotzils, *uchum* means to grind in a mill, from which *ghuchumbil*, a corn mill (*moler*, *molino*).

6. *Nabey mam*.—"First old man." In most of the dialects *mam* means the maternal ancestor. Here the word is used metaphorically in the sense "prematurely old," because the corn planted in this and the following months ripened prema-

* Dr. Stoll (*Ethnologie der Indianerstämme von Guatemala*, s. 60) found the swarming times of the termites, *Caloterme castaneus*, in Guatemala, to be March 22 and May 24, dates which do not coincide with the Calendar. He omits, therefore, the former, and refers to an occasional flight about the middle of June.

turely, and did not reach full growth; and they believed the same was the case with animals born at this time (*tiempo de revejidos*, porque no crecía muy alta la milpa que por este tiempo se sembraba, y aun las criaturas que nacían. Note to the Calendar). Doubtless it was for this reason that, as Father Varea tells us, both months of *mam* were regarded as of evil portent, and the natives were accustomed to say: *Itzel k'ik ca vinak k'ih mam*, "they are bad days, the forty days of *mam*." *Vocabulario*, MS.

7. *Rucab mam*.—"Second old man."

8. *Lik' in k'a*.—"Soft to the hand," from *li'k*, soft, and *k'a*, hand. The expression refers to the soil which was then soft owing to the rains (*tiempo en que esta la tierra blanda y resbalosa por las muchas aguas*. Note to the Calendar).

9. *Nabey tok' ik'*.—"The first cacao harvest," from *tok'*, the cacao harvest (*cosecha de cacao*, Ximenes. *Vocabulario*, MS.).

10. *Rucab tok' ik'*.—"The second cacao harvest."

11. *Nabey pach*.—"The first hen hatching." (*Tiempo de empollar las cluecas*. Note to the Calendar.) The name is from the verb *pache*, to brood, to set as a bird (Ximenes).

12. *Rucab pach*.—"The second hen-hatching."

13. *Tziquin kih*.—"The season of birds," from *tziquin*, bird, *k'ih*, day, time, season.

14. *Cakan*.—Derived from *k'ak*, red; according to the Cak. Calendar from the reddish clouds (*celages rojas*) often seen at this season; according to others, and more probably, from a species of red flowers which blossom at this time.

15. *Ibota*, or *Obota*, or *Botam*.—A note to the Calendar says: "The season of various colors, or, of mats rolled up." In the latter sense the name would be from the verb *bot*, to roll up, *botal*, that which is rolled up (*lo arollado como petate*. Guzman, *Vocabulario*, MS.). Gavarrete gives "*rollo de estera*," a roll of mats. The signification is not clear.

16. *K'atic*, or *Qatic*.—This is explained in a note to the Calendar as “pasante ó siembra comun.” The derivation suggested would be from *k'atoh*, a banquet, a festival, and to invite to such.

17. *Izcal*, or *Itzcal*.—Translated in the Calendar as “the season of sprouts or of throwing out shoots” (*retoñar ó echar primipollos*). The word is undoubtedly the Nahuatl *Itzcalli*, the name of the eighteenth month in the Mexican year. Its signification is “renewal,” or “resurrection,” or “growth;” this is indicated in the application of the word in the Cakchiquel Calendar.

18. *Pariché*, or *Payriché*.—“The season for covering, in order to protect one's self from the cold,” says a note to the Calendar. The derivation is from *parah*, the covering of palm leaves used to protect a person from the rain; and *che*, tree or wood. The same idea is conveyed in the Tzentel month-name *Muc*. Gavarrete's explanation, “firewood,” from *che*, wood, and *parquii*, bushes or small trees, is not tenable.

THE QUICHÉ MONTHS.

Although there was little difference between the Quiché and Cakchiquel dialects, their month-names varied in several instances. Our sources of information concerning the Quiché names are authentic, several of their Calendars dating from the seventeenth century having been preserved. From these Gavarrete published a list in the work already referred to, and I have in my possession a copy of a native Calendar in the Quiché dialect written about 1722.

Months of the Quiché Calendar.

- | | |
|----------------------|----------------------|
| 1. Tequexepual. | 10. Ucab pach. |
| 2. Tziba pop. | 11. Tzizi lakam. |
| 3. Zac. | 12. Tziquin k'ih. |
| 4. Ch'ab. | 13. Cakam, or Cakan. |
| 5. Nabey mam. | 14. Botam. |
| 6. Ucab mam. | 15. Nabey zih. |
| 7. Nabey lik'in k'a. | 16. Ucab zih. |
| 8. Ucab lik'in k'a. | 17. Rox zih. |
| 9. Nabey pach. | 18. Chee. |

Derivations.

1. *Tequexepual*.—See Cakchiquel months, No. 1.
2. *Tziba Pop*.—"Painted mat." Compare the Maya name for their first month.
3. *Zac*.—"White." The same as the eleventh Maya month, but with the Quichés it probably referred to certain white flowers blooming at this season.
4. *Ch'ab*.—Gavarrete translates this as "bow," which is, in fact, the meaning of *chab*;* but I have no doubt that the right word is *ch'ab*, from *ch'aban*, mud, mire, from the muddy condition of the soil at this season.
5. *Nabey mam*.—See the sixth Cakchiquel month, of this name.
Gavarrete inserts as the fifth month, between *Ch'ab* and *Nabey mam*, a month named *Hun bix k'ih*, "the season of the first singing" of certain birds, or, "of the first fires," *bix* having both these significations. He omits the name of *Botam* for the fourteenth month, and thus preserves the proper number.
6. *Ucab mam*.—The second *mam*. See above.
7. *Nabey lik'in k'a*.—The first *lik'in k'a*. See the Cakchiquel month of this name.
8. *Ucab lik'in k'a*.—The second *lik'in k'a*.
9. *Nabey pach*.—The first *pach*. See the Cakchiquel month of this name.
10. *Ucab pach*.—The second *pach*.
11. *Tzizi lakam*.—*Tzizi*, from *tzizil*, the small sprouts or shoots which begin to appear; *lakam* means flags, or banners, and seems to refer to the shape or appearance of these.

*In the Quiché, Cakchiquel, Pokomam and Pokomchi dialects, *chab* means both "bow" and "arrow." Strictly it means the bow only, the arrow being *al*, or *yal chab*, "son of the bow."

12. *Tziquin k'ih.*—"Season of birds." See the Cakchiquel month of this name.

13. *Cakam.*—See the Cakchiquel month of this name.

14. *Botam.*—See the Cakchiquel month *Ibota.*

15. *Nabey zih.*—The first *zih.* The word is explained as a tree which bears abundant white flowers and blossoms at this season. Gavarrete gives erroneously *Tzih*, "word."

16. *Ucab zih.*—The second *zih.*

17. *Rox zih.*—The third *zih.*

18. *Chee.*—Trees or wood. See the Cakchiquel month *Pariche.*

THE CHAPANEC CALENDAR.

The Chapanecs of Chiapas, belonging to a linguistic stock wholly different from the Mayas, Nahuas or Zapotecs, also made use of this Calendar. This we know from the fact that they counted 18 months to their year, each of twenty days, and allowed five intercalary days, called *nbu*, precisely as did the Nahuas and Mayas.

It is peculiarly unfortunate that we have not the names of their days, and those of their months are preserved in a sadly imperfect manner. Mr. Alphonse Pinart has published two lists, both incomplete, at the close of his edition of the *Arte de la Lengua Chiapaneca*, of Fray Juan de Albornoz; but they do not seem to have constituted a part of that work; at least they are not in the MS. copy of it in my possession.

It would not be difficult for a person acquainted with the climate and routine of culture pursued by the Chapanecs to construet from these two lists one which would be accurate and complete, but as I do not possess that knowledge, I give them as they are, so as to complete this portion of my study. I add, in some instances, possible derivations, from the MS. Chapanec Vocabulary of Dr. Berendt, but in most cases the etymology of the names is quite obscure.

Months of the Chapaneec Calendar of Chiapa.

1. May 15. *Tumugûi*, or *Tamugûi*.—"Chile is sown." Begins May 15.
2. June 4. *Iatati*, or *Hatati*.—"The winds begin."
3. June 24. *Ñumbi*.—"Maguey is sown."
4. July 14. *Cutamé*.—"The weather changes."
5. August 3. *Iaumé*, or *Haumé*.—"Dampness."
6. August 23.
7. September 12. *Majua*, or *Mahua*.—"Cold."
8. October 2.
9. October 22.
10. November 11. *Mua*.—"Camotes (batatas) are planted." In Chapaneec these are called *nua*.
11. December 1. *Tupiu*.—"The dampness increases." Probably from *tipi*, mist or fog.
12. December 21. *Tuhu*, or *Tujiu*.
13. January 10. *Muhu*, or *Mu-u*.—"Mosquito time."
14. January 30. *Turi*.—"Ripeness."
15. February 19. *Manga*.—"Time for little fishes" (fish, *nangasi*).
16. March 11. *Puri*.—"The jocote ripens" (jocote, *luri*, *Spondias edulis*).
17. March 31. *Cuturi*.—"The jicalpestle (gourd) ripens."
18. April 20. *Cupané*.—"The coyol (*Bactris vinifera*) ripens."

Months of the Chapaneec Calendar of Su-Chiapa.

1. June 4. *Yucu*.
2. June 24. *Ñumbi*.—"Maguey is sown."
3. July 14. *Muhu*.—"Mosquito time."
4. August 3. *Hatati*.—"The winds begin."
5. August 23. *Mundju*.—"Chile is sown."
6. September 12. *Catani*.—"The rains cease. Maize begins."
7. October 2. *Manga*.—"Fishing begins."
8. October 22. *Haomé*.—"Rivers fall, and fish leave."
9. November 11. *Mahua*.—"Cold begins."
10. December 1. *Toho*.—"No planting done."
11. December 21. *Mua*.—"Camotes are planted."

12. January 10. *Topia*.—"The dampness increases."
13. January 30. *Tumuhu*.—"Nothing is done."
14. February 19.
15. March 11. *Cupamé*.—"The coyol ripens."
16. March 31. *Puri*.—"The jocote ripens."
17. April 20. *Puhuari*.
18. May 10. *Turi*.—"Time of ripening."

§ 13. THE SYMBOLISM OF THE DAY NAMES.

Whatever other uses of an astronomical and time-measuring character the Calendar had, the best known and most general service which it rendered was for divinatory purposes. Indeed, early writers, such as Sahagun and Cordova, assert that the ritual Calendar of 260 days was confined to this object.

Unfortunately, they have not left us precise details. For in spite of a large amount of desultory information in their works and those of other early writers, the basic theory of the art of divination, according to this Calendar, is nowhere stated. I propose to offer a suggestion as to what this was, as appears to be indicated by the Calendar itself, and to be supported by a number of collateral facts mentioned by early authorities.

The period of 20 days, each bearing its own name, was certainly derived from the vigesimal system of counting. This was in use in precisely the same manner in all those of the linguistic stocks under discussion. In all, the unit of the higher integers was 20.* This multiplied again by 20 gave 400, and this again by 20 gave 8000, which in each was the highest number for which they had a single expression.

This number 20 was based on finger-and-toe counting, and so clearly was this reflected in the languages that in Nahuatl it bore the name *cem poualli*, "one (whole) count;" in Tzental *hun vinic*, "one man;" and in Quiché and Cakchiquel, *vinak*, "a man" (homo). The Maya *kal*, and the Zapotec *cal-le*, appear to have the signification "completed," "filled up," referring to the completed count of fingers and toes.

In this manner the number 20 came to represent symbolically

* The vigesimal (quinary-vigesimal) system obtained in most of the stocks of Mexico, Central America and Northern South America. North of Mexico it is rarely found, as among the Tlinkit and Pawnees. Elsewhere the decadal plan is in vogue (see Müller, *Grundriss der Sprachwissenschaft*, Bd. II, Ab. I, s. 183).

the whole of man, his complete nature and destiny, and, mystically, to shadow forth and embody all the unseen potencies which make or mar his fortunes and his life.

I have already spoken of the various theories to account for the 13-day period. Whatever one we accept, I am persuaded that this period was posterior and secondary to the 20-day period. At any rate, it was distinctly so regarded in the divinatory systems. Cordova, speaking of the Zapotec Calendar, which was certainly the most primitive in form, tells us that each of the 20 signs had not only 13 numbers each, but 13 names, or rather 13 varieties of the same name.*

In the region of the Tzental, Bishop Nuñez de la Vega describes as a common figure in their books of divination the demon *Coslahuntox*, who was painted in a sitting position and with horns on his head, his name meaning "the demon with 13 powers." †

In this garbled account we must correct *Coslahuntox* to *oxlahun tox*, "the thirteen divisions" or "parts;" ‡ and the "horns" to the plumed headdress of quetzal or other feathers.

Just such seated and crowned figures are found on sculptures from the ancient cities of Ocozingo and Palenque, in the territory of the Tzental; one from the latter seated on a double-headed tiger, and another from the former where the tiger is conventionalized into an elaborately carved block of stone. § These, and others like them, represent the divinity of the day, seated with empty hands to show that he is a ruler and is not required to labor, precisely as the early missionaries tell us was the native idea of sovereignty among those peoples. ||

* "Cada uno de aquellos animales que eran veynete tenía trece nombres, y aunque todos estos trece nombres eran en sí como una cosa, diferenciabanlos con les añadir ó quitar letras." Cordova, *Arte de Lengua Zapoteca*, p. 203.

† "Al que llaman Coslahuntox (que es el demonio, según los indios dicen con trece potestades) le tienen pintado en silla y con astas en la cabeza como de carnero." Nuñez de la Vega, *Constituciones Dioecanas*, p. 9.

‡ The Tzental verb *q'tox* means to divide, to separate, to split. See above, note to page 281.

§ The figure from Ocozingo is given by E. G. Squier in his *Observations on the Chalchihuitl of Mexico and Central America*, p. 11 (New York, 1869). The bas relief from Palenque is familiar from the works of Stephens, Charnay and others. In the Museum of the Trocadero, Paris, are several small seated figures of a similar character, some bearing a day sign upon. They were collected by M. Pinart in Tzental territory, and have by some been remarked upon as similar to the seated statues of Buddha. I take them to be of the same class with the images just mentioned.

|| See the remarks of Father Coto in his *Diccionario de la Lengua Cakchiquel*, which I quote in my *Essays of an Americanist*, pp. 115, 116, note (Philadelphia, 1890).

That the same allocation obtained among the Nahuas is testified to by Sahagun, whose words are, speaking of the divinatory Calendar: "It was composed of 20 signs. . . . To each sign were allotted 13 days." He adds: "This method of divination has nothing to do with natural astrology, or the movements or aspects of the planets, but takes as its point of departure certain signs and numbers which are not derived from natural phenomena, but must have been invented by the Devil himself." "They asserted this system was a divine revelation from Quetzalcoatl; it consisted of 20 signs, each multiplied 13 times."*

This writer dilates more than any other on the details of the Nahuatl divinatory system, but leaves his readers in the dark why the individual signs were chosen, or what their relation to each other and the general system was supposed to be.

I do not pretend to be able fully to supply this regrettable lacuna in our knowledge of the philosophy of these ancient nations. But I believe that their system was in a certain sense philosophic; that it grew out of ripe meditation on the agencies which direct and govern life; and that it was merely veiled—not smothered—in the symbolism which has been transmitted to us, and which they found it convenient to throw around it, in presenting it to the unlearned.

The 20 potencies or agencies, fixed at that number for the reason above given, follow each other in the sequence in which they were believed to exert their influence on the life or existence not of man only, but of things and of the universe itself. This opinion exerted a strong constructive and directive influence on the national myths, rites, and symbolism, extending to architecture and ornament, to details of government, and to the everyday incidents and customs of national and domestic life. In all of these we perceive a constant recurrence of the signs and their correspondent numbers, drawn from the composite relations of 20 : 13.

Turning to the symbolic meaning which may be discovered in the signs and names of the twenty days, I shall examine each briefly :

Day 1.—The Swordfish, Crocodile, Spiderfish or other "Marine Monster."

According to the Codex Fuenleal, at the beginning of things the gods made thirteen heavens, and beneath them the primeval

* Sahagun, *Historia de la Nueva España*, Libro IV, p. 303m.

water in which they placed a fish called *cipactli* (que es como caiman). This marine monster brought the dirt and clay from which they made the Earth, which therefore is represented in their paintings resting upon the back of a fish.

This sign, therefore, signifies the material beginning of existence or life in the Earth or in the individual, the substance into which it is shaped.

The *cipactli* was an entirely mythical creature, and was not intended to represent any known species.* Therefore any curiously shaped fish was selected. The word has been variously interpreted, but none of the renderings seems appropriate.† I would suggest that it is a compound of *ce*, one the whole, and *patia*, to liquefy, to become water, which is in full concordance with the native myth of creation above referred to.

Day 2.—Wind or Air, Breath, Spirit, Soul.

In American symbolism air or wind constantly signifies the immaterial life, that which exists apart from physical substance.

The first two of the twenty symbols therefore point to the double origin of being conceived as matter and spirit, body and soul, extension and thought.

Day 3.—Night, Darkness, the House.

The symbolic idea underlying these signs is that of repose. Night is the time for sleep, the house is the place of rest, darkness suspends labor and relaxes effort. Old age and the harvest close, the one the activities of the career, the other the toil of the agriculturist.

Day 4.—The Lizard, the Iguana.

The flesh of the iguana was a favorite article of food, and the animal was taken as the symbol of nutrition and abundance. Among the Pipils the god of maize and the food supply presided over this sign and its signification was plenty and fullness.‡

* This is also the opinion of Orozco y Berra, *Hist. Antigua de Mexico*, Tom. i, p. 54.

† Several may be found in Boturini, *Idea de una Nueva Historia General*, p. 46.

‡ Nuñez de la Vega, *Constituciones Diocesanas*, p. 10, and *Codex Telleriano-Romensis*, Lam. xiii (in Kingsborough's *Mexico*).

Day 5.—The Serpent.

Dr. Seler thinks that the signification of this symbol is poverty or want. According to Pedro de los Rios, however, the serpent, in Mexican symbolism, represented especially the phallus and therefore the reproductive force, the sexual life.* Of course, here as in other symbolisms, this animal conveyed many other meanings; but there is reason to suppose this was the one especially intended in this relation.

Day 6.—Death, the Severed Head, the Skull.

The chief signification of this sign illustrates the notion of "counter-sense" which so often occurs in language, mythology and folk-lore. Modern dream-lore says that dreams before midnight "go by opposites," that is, they must be taken opposite to their obvious purport. This theory of contrasts is based on some idea of compensation, or else on that of esotericism, which "least does mean, what it most does show."

In accordance with this plan, the meaning of this sign in Nahuatl symbolism was chiefly, not death, but birth. The goddess of parturition, Tonacacihuatl, was patroness of the day; and the snail shell, typical of the womb (for out of it, as the snail from its shell, emerges the neonatus), was her emblem; to which may be added the sad and close connection which often exists in child-bearing between birth and death (of the mother).

The intimate relation of this to the preceding sign, and the natural sequence thus established, will be evident.†

Day 7.—The Deer.

The signification of this symbol is obscure. According to some of the interpreters, it meant drought; but its patron among the Aztecs was Tlaloc, the god of the rains. The Nahuas of Nicaragua, on the other hand, explained this sign as representative of success in hunting.‡

* De Rios, in his notes to the Codex Vaticanus, in Klugsborough's *Mexico*. The phallus was a prominent object of worship in ancient Mexico. See Tanyre, *Explor. des Regions Mexicains*, p. 233, and other modern authorities.

† ‡ The contrasted meaning of this sign is fully recognized by Dr. Seler (*Aztek. und Maya Handschriften*), though he fails to see its relation to the sign preceding it.

‡ Oviedo, *Historia de Indias*, Tomo iv, p. 55.

Day 8.—The Rabbit, the Seed, the Flower Garland.

As the former sign seems to indicate fortune in the chase, so does this one in cultivating the fields. The figure in the full moon was called by the Nahuas "the rabbit;"* the animal also symbolized ease, idleness, and especially drunkenness. The god of drunkards bore this name.† This, however, must have been a later application, as the intoxicating pulque was known in but a limited area and probably its invention was much later than the adoption of the sign.

This and the previous sign seem to refer to the two chief sources of the food supply, hunting and agriculture.

Day 9.—Water, Thunder-storms.

The rains may be regarded as the agents of productiveness and the creators of fertility; or, on the other hand, as those which bring gloomy, sunless days, dampness, chilliness, rheumatic pains, coughs and disease. The thunder terrifies, the lightning destroys, the floods overwhelm.

It is from the latter aspect that water is contemplated in this sign. It represented sickness and desolation. Hence, among the Nahuas, it was deemed ominous of evil and its patron was the yellow-visaged god of fire, Ixcocauhqui, indicative of its desolating portent.

Day 10.—The Dog, the Stealer.

The dog among the Nahuas was held in small esteem, and was badly treated. "A dog's life," with them, as with us, meant a miserable one. Their verb *itzcuinizcaltia*, "to be brought up like a dog," conveyed the same ideas of bad treatment and hardship that the phrase does among ourselves. A very common locution in Nahuatl to signify affliction is *in teltl, in quahuittl*, "with stick and stone," as one treats a dog.

The dog was closely associated with the notion of death; the Nahuatl patron of the day was the god of hades, Mictlantecutli, and he was painted with a man in the last stages of misery fol-

*As do now the common people of India and some Mongolian tribes. See Grimm, *Teutonic Mythology*, p. 716 (Eng. Trans.).

† See my *Sacred Songs of the Ancient Mexicans*, p. 61 (Philadelphia, 1890), for an illustration of the "Totochtin," or rabbit gods of drunkenness and a hymn to them taken from the unpublished MSS. of Father Sahagun.

lowing him. The animal holds the same relation in the Maya hieroglyphs.*

The sign of the dog, therefore, denoted hardship and suffering.

Nevertheless, by the concurrent testimony of Sahagun and Duran, both this and the following day sign were deemed peculiarly prosperous and fortunate. Children born on them would arrive at positions of dignity and importance and shed lustre on their families. The notion would seem to be that such would overcome all difficulties.

Day 11.—The Monkey.

The monkey, like the dog, was a domesticated animal among some of the Nahuatl and adjacent tribes. Father Sahagun narates the artifices adopted to catch them while young for the purpose of taming them.† There seems a purpose in placing these two domestic animals side by side in the Calendar. They were both highly auspicious signs, and indicated successful contest with obstacles.

Day 12.—The Broom, Teeth or Points.

The twisted brush of mallinalli grass or of the sharp *itztlaitl* was probably the symbol intended by this sign, whether referred to as "the thing twisted," or "the thing with many points."

Its meaning is obvious. As that which is swept away is dirt and dross, lost to sight and discarded, it has been recognized by most of the old writers that the significance is the evanescence, the transitory character, of earthly possessions. ‡

Day 13.—The Reed or Cornstalk.

In Tzental and Maya it is distinctly the dry and dead cornstalk, *cagh-ben*, which corresponds to the Nahuatl patron of the day, the god of cold and dryness, Itztlacoliuhqui. § The sug-

* See Dr. Schellhas' observations and references in *Zeitschrift für Ethnologie*, 1892, pp. 119, 120.

† *Historia de Nueva España*, Lib. xi, cap. 1, sec. 5.

‡ "Symbol der Vergänglichkeit, Unhaltbarkeit, des Dahinsterbens." Seler, "Das Tonalamatl," in *Compte-Rendu of the Congress of Americanists*, Eighth Session, p. 591 (Berlin, 1890).

§ Literally, "pinched or bent with cold," applied also to a peculiar headdress designating this. Sahagun, *Hist. de Nueva España*, Lib. II, cap. xxx. I prefer the derivation of this word from *itztle*, cold, as given by Slinçon, to the more remote one from *itzli*, obsidian, offered by Seler.

gestion distinctly is of advancing years with the loss of the vital warmth of youth.

Day 14.—The Tiger (Jaguar), or Sorcerer.

According to the *Annals of Cuauhtitlan* the tiger symbolized the nocturnal heavens dotted with stars as the jaguar skin with spots.* That this was the significance of this day sign receives added probability from a figure in the Codex Borgia, where the goddess of the sign is accompanied by a picture of the moon and the night sky sown with star-points.†

The moon and the stars were the especial field of study of the seers, the sorcerers and the wise men; hence the underlying meaning of the sign was occult or mystical knowledge.

The especial constellation known to the Nahuas as *ocelotl* was the Great Bear; it mythically represented the god Tezcatlipoca deposed from his position as the sun god, and falling into the sea. ‡

Day 15.—The Eagle, the Bird, Knowledge.

In the Nahuatl symbolism the eagle, *quauhtli*, is generally understood to mean "war." But this sign in the other languages would seem to stand for knowledge or skill.

Day 16.—The Vulture, or Owl.

According to the Nahuatl interpreters, this is the sign of old age, of long life, derived perhaps from the bald head of the vulture. The owl in all these nations was regarded as a bird of evil omen. We may understand the reference in both to be to the infirmities and losses of old age.

Day 17.—Strength, Motion.

The idea apparently conveyed by this sign is the disastrous results of strength exerted. It is in the myths connected with earthquakes, eclipses and the end of the world, and its representations portray death, human sacrifice, and destruction. The

* See *Anales del Museo Nacional de Mexico*, Tom. ii, p. 254.

† Given by Dr. Seler, *Aztek. und Maya Handschriften*, p. 25, who, however, derives a different meaning from it.

‡ See Orozco y Berra, *Historia Antigua*, Tom. i, cap. ii.

motion is the shaking, tottering movement of the paralyzed or the aged, or that of the earth in its convulsions.*

Day 18.—The Flint Knife.

What is intended is the sacrificial knife or the spear point, stained with blood as an instrument of death. The suggestion is death in war, or as a victim.

Day 19.—The Lightning.

In this sign the thunder-storm was considered as the begetter of sickness, and, like water, as portrayed under the ninth day sign, the maleficent effects of the thunderbolt, the pouring rain and the floods were those intimated. The interpreters considered it, therefore, a day of evil omen.

Day 20.—The Chieftain, the Flower.

As previously stated, the real symbol of this day was the sun. This is to be understood in its mythical sense as the haven of life, the place of repose of souls, the resting place of the dead; as I have stated in general terms in a previous work, "The home of the Sun is the heaven of the Red Man." † This is true all over the continent, and there is a peculiar significance in finding it borne out by the symbolism of this remarkable Calendar.

§ 14. GENERAL SYMBOLIC SIGNIFICANCE OF THE CALENDAR.

Restoring the figurative terms to their literal meaning, we may conclude that the general and original symbolism of the day names in all the tongues in which we have them were as follows :

DAY.	SYMBOL.	HIERATIC SIGNIFICANCE.
1.	Swordfish.	Birth, the beginning.
2.	Wind.	Breath, life, the soul.
3.	Darkness, the house.	Sleep, rest, repose.
4.	Iguana.	Food, nourishment.
5.	Snake.	Sexual life, reproduction.

* The present (the fifth) age of the world, according to Mexican mythology, was expected to end in this sign. *Codez Telleriano-Remensis*, Lam. x.

† See my *Myths of the New World*, Chap. ix, for abundant testimony on this point.

DAY.	SYMBOL.	HIERATIC SIGNIFICANCE.
6.	Death.	Child-bearing, children.
7.	Deer.	Hunting.
8.	Rabbit, seed.	Agriculture.
9.	Water, rain.	Illness (or, productiveness).
10.	Dog.	Hardship and suffering (success through them).
11.	Monkey.	Difficulties surmounted.
12.	Broom, teeth.	Loss, evanescence.
13.	Reed.	Cold, drought, advancing years.
14.	Tiger.	Learning, wisdom.
15.	Eagle, bird.	Knowledge, skill.
16.	Vulture, owl.	Old age, misfortunes.
17.	Motion.	Debility, failing powers.
18.	Flint knife.	War, death.
19.	Lightning.	Sickness, destruction.
20.	Sun.	The house of the soul.

An examination of this sequence here exhibited, which is in the main accurate, though doubtful in some specifications, reveals that it was intended to cover the career of human life, from the time of birth until death at an old age.

The individual emerges from the womb of his mother and the parturient waters, as did the earth from the primeval ocean; he receives breath and with it life, which is supported by repose and food. The man reproduces his kind; the woman, at the risk of death, brings her child into the world. The chase and tilling the ground are the leading occupations of peace, and he who holds firm through illness, suffering and hardships, will gain the prizes of life. Having reached the acme of his career, the decline commences. Losses multiply, years increase, and though knowledge and wisdom are augmented, old age comes on apace with failing powers, with vanquished struggles, with sickness and death; until at last, its course run, its task completed, the soul quits the worn-out body and soars to its natural haven and home, the abode of the Sun.

Such, it seems to me, without any straining, is the philosophical conception of life which was intended to be conveyed by the symbols of this strange old Calendar. They may not have originated contemporaneously with it; certainly not, if it was primarily deduced from astronomical observations; but quite probably, if, instead of this, it was built on terrestrial relations and mythical concepts.

In the twenty headings under which the agencies which influence human life were arranged, the ancient seers believed they had exhausted the arithmetical unit which stood for the completed individual—his vigesimal equation and correlate; in the thirteen modes of activity which they assigned to each of these agencies, they had taken into account the thirteen possible relations of each to both the material and immaterial worlds; and the fact that the result of 20×13 expressed in days gives approximately nine lunar months, the period required for the unborn babe to pass through its evolution from conception to birth—a period perfectly familiar even to the wild hunting tribes—gave them whatever needed confirmation they wished for the mystic potencies of these cardinal numbers.

The Great Mesozoic Fault in New Jersey.

By Benjamin Smith Lyman.

(Read before the American Philosophical Society, September 15, 1893.)

Great faults, the ever-ready, easy resource of geologists to cover up their own deficiencies or mistakes, have, without any substantial proof, been liberally conjectured again and again to account for what has been supposed to be a wholly impossible apparent thickness of the older Mesozoic rocks of New Jersey. For those rocks have, from their conformability throughout, and their predominant color and a comparative lack of fossils through a great part of them, been commonly lumped together as only a single group, formation, or system, under the general name of New Red, or Triassic, or Jurassico-Triassic, or Rhaetic. Nearly forty years ago, with the bold assurance born of ignorance, perhaps quite pardonable at that time, the special name of Newark group was proposed for the whole lot, from one of its most striking local economic features, though otherwise an extremely subordinate one, and even economically perhaps inferior to the Richmond coal; and latterly there has been an effort to revive the name, long after it had fallen into well-merited oblivion. The assumption has been: the whole series is but one formation; one formation can be no more than about 5000 feet thick; therefore, the whole series is at most 5000 feet thick.

It now appears, however, from recent researches in course of publication by the Geological Survey of Pennsylvania, that the total thickness of the so called New Red does incontestably far exceed the thickness